

# SUPPLEMENT.

# The Mining Journal, RAILWAY AND COMMERCIAL GAZETTE:

FORMING A COMPLETE RECORD OF THE PROCEEDINGS OF ALL PUBLIC COMPANIES.

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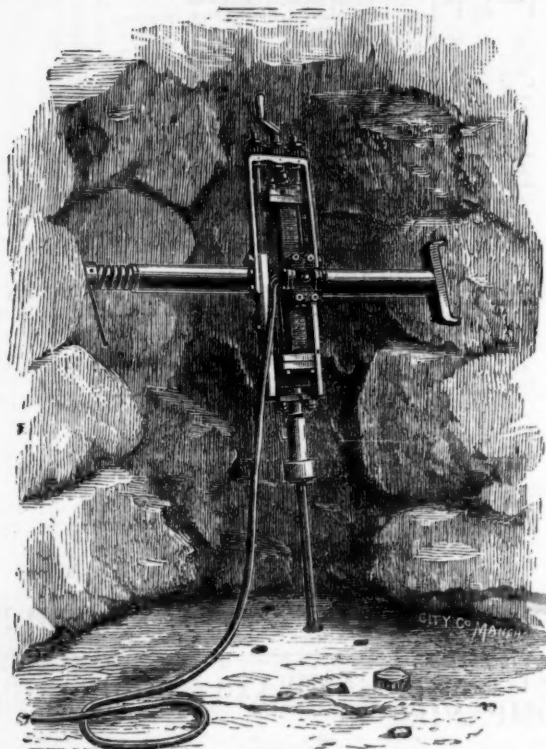
No. 2512.—Vol. LIII.

LONDON, SATURDAY, OCTOBER 13, 1883.

PRICE (WITH THE JOURNAL) SIXPENCE  
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FIRST SILVER MEDAL, ROYAL CORNWALL POLYTECHNIC  
—Highest Award for Effectiveness in Boring, and Economy in  
the Consumption of Air  
JUBILEE EXHIBITION, 1882.

## THE PATENT "GORNISH" ROCK DRILL.



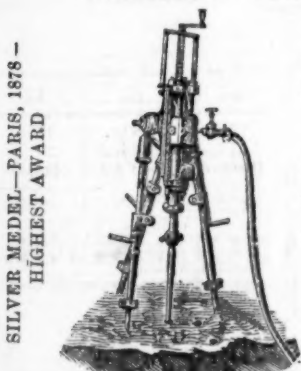
This Drill has been constructed after a long practical experience in the requirements necessary for Mines, and has more than realised the expectations of its inventors. The chief objects in view were GREATER DURABILITY AND LESS LIABILITY TO DIS-ARRANGEMENT; but it has also proved itself more EFFECTIVE AND ECONOMICAL.

We are now prepared to enter into any reasonable arrangement so as to enable users to judge of its merits, as we are thoroughly convinced that we can offer the BEST ROCK DRILL IN THE MARKET.

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## THE PATENT "ECLIPSE" ROCK-DRILL AND "RELIANCE" AIR-COMPRESSOR.



SILVER MEDAL—PARIS, 1878—  
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Are NOW SUPPLIED to the  
ENGLISH, FOREIGN, and  
COLONIAL GOVERN-  
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AND  
HIGHEST  
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- 1875—Leeds.
- 1875—Cornwall.
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- 1877—Cornwall.
- 1877—Mining Institute.
- 1878—Paris.

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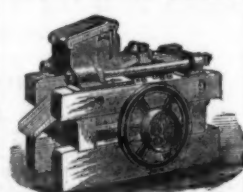
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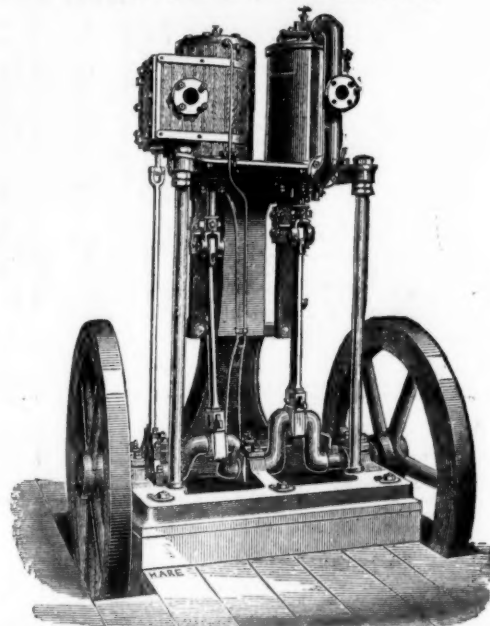
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In Cornwall, irrespective of the work done by the "Champion" Rock-borers purchased by various Mines, the drivage, rising, stopping, and sinking on the proprietor's own contract work, amounts to over 1070 fathoms.

The wood-cut represents one of these Air-Compressors. Four of them, of three different sizes, can be seen, at work, in about an hour's walk through the Camborne Mining District.

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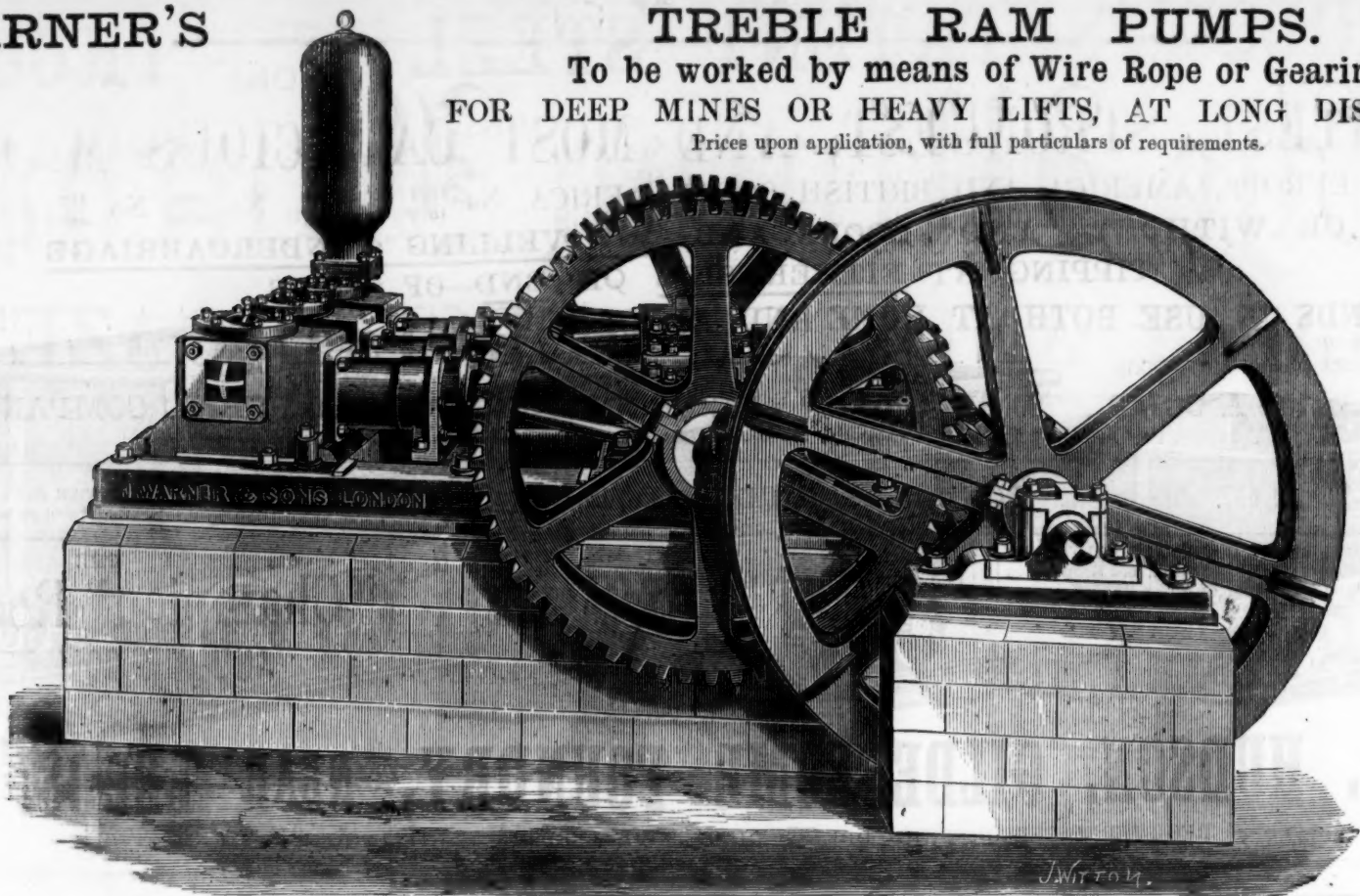
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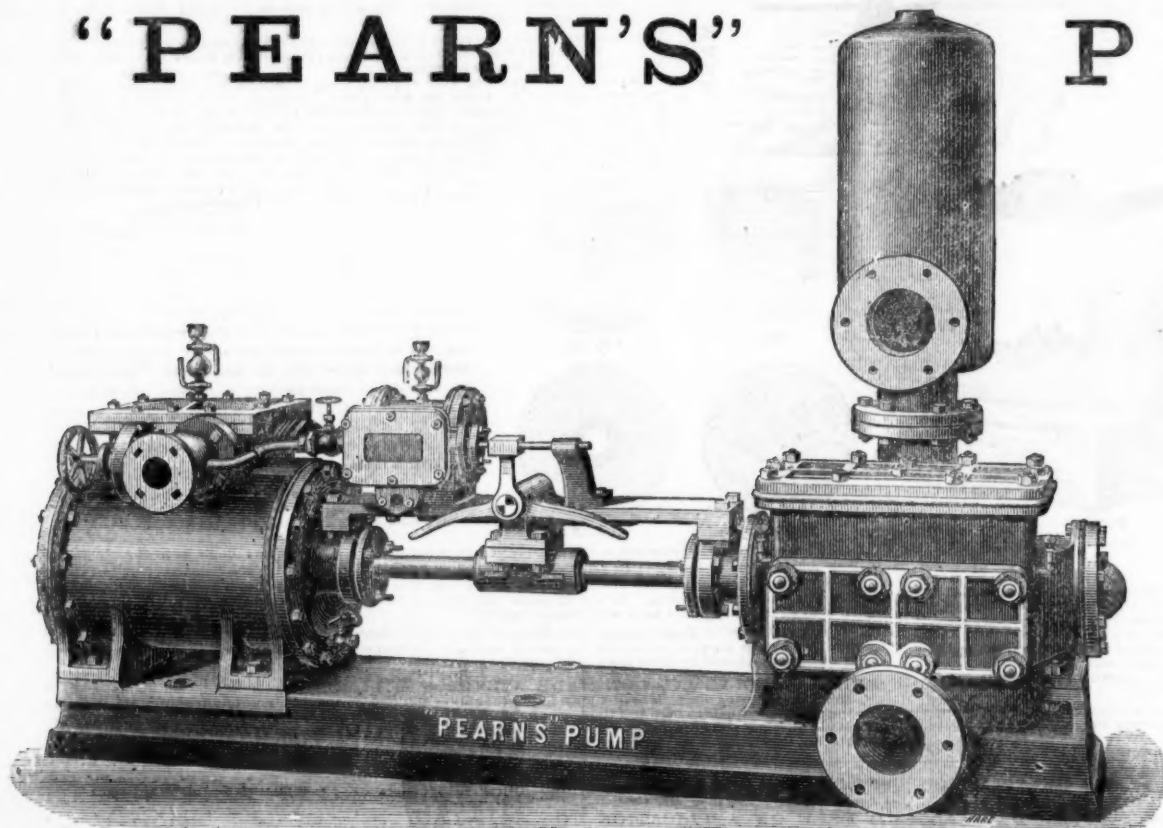
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IT HAS NO INTRICATE PARTS, the WORKING PARTS are the same as used in the ordinary STEAM ENGINE.

It is as Simple and as DURABLE as any Fly-wheel Pump, and cannot possibly become DERANGED.



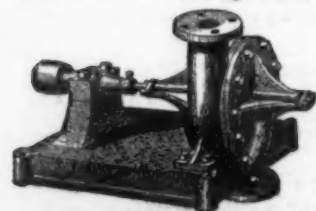
DIAMETER OF WATER CYLINDER..... In.	2	2½	3	3½	4	4½	5	6	7	8	9	10	12	14
DIAMETER OF STEAM CYLINDER.....	4 in.	5 in.	6 in.	6 in.	7 in.	7 in.	8 in.	10 in.	12 in.	12 in.	14 in.	14 in.	16 in.	18 in.
Length of Stroke ..	9 in.	9 in.	9 in.	9 in.	12 in.	12 in.	12 in.	12 in.	12 in.	12 in.	18 in.	24 in.	24 in.	24 in.
Content, Gallons per Hour .....	650	1500	2160	2940	3840	4860	6000	8640	11590	15360	19440	24000	34650	46360
Price..... £	18	22	24	28	35	38	45	60	70	85	130	140	180	230

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**BELL'S PATENT ASBESTOS BLOCK PACKING**, for Marine and Pumping Engines. This packing has been specially designed to overcome the difficulties experienced by marine engineers and others in the practical working of engines of the most modern type of construction. The greatly increased skill and workmanship now obtained in the construction of engines and boilers have led to a rapid increase in the working pressure, the object being the attainment of a high rate of speed combined with economical working, the practical advantage of which, however, cannot be realised unless the Packings are so constructed as to avoid stoppages at sea for the purpose of re-packing the stuffing boxes.

It is now a recognised fact that the most perfect heat-resisting material suitable for the purpose of a Packing is Asbestos, but to ensure a successful application of this fibre, great skill is required in its selection and manufacture. In this Packing the Asbestos is woven into a stout cloth, and owing to the peculiar way in which it is manipulated, great elasticity is imparted to the Packing. So successfully has this been done, that with light screwing, it has been found in practice that little or no lubricant is required to ensure a minimum amount of friction, and to keep the rods from over-heating. An improved vacuum is always maintained by the use of this packing, which meets with unqualified approval wherever it is applied.

This packing is made in four forms to meet various requirements, viz., as Fig. 1, square; 2, round with solid rubber core; 3, with tubular rubber core; 4, without core, but with rubber inlaid.

As these packings are extensively imitated, and as it is a common practice among dealers and agents to supply the cheaper manufactures at my list prices, users are requested to see that the packing supplied to them bears my trade mark.

**BELL'S PURE ASBESTOS PLAITED YARN PACKING.** This is the best and most economical Piston Packing in the market for High and Low Pressure Stationary Engines. Of course there are many imitations of a Packing so universally approved of, but I am the Original and Sole Manufacturer of the genuine article.

Every 10 ft. length of this Packing bears a label with my Trade Mark, and users are recommended to see that this label is attached, to secure their obtaining the material they have ordered.

**BELL'S ASBESTOS YARN and SOAPSTONE PACKING** for Locomotives, and all Stationary Engines running at a very high speed with intense friction.

The following Testimonial refers to this packing:—  
Festiniog Railway, Locomotive Superintendent's Office, Portmadoc, January 13th, 1883.

Mr. John Bell, 118, Southwark-street, S.E.  
DEAR SIR,—I have much pleasure in saying that the Asbestos Yarn and Soapstone Packing gives every satisfaction; indeed better than we expected. We have a locomotive packed with it, which has been running five months (and think of the piston speed with our small wheels). I think the Soapstone a great improvement, as it keeps the packing elastic, and prevents it getting hard. I am very pleased with its working, and also the very low price for such good lasting packing. The Asbestos Yarn we find is very useful, and answers admirably.  
Yours truly,  
(Signed) W. WILLIAMS.

Every 10 ft. length of Bell's Asbestos Yarn and Soapstone Packing bears a special label with the Trade Mark, and engineers are earnestly requested to see that this label is attached, to prevent imposition by worthless imitations.

TRADE



MARK.

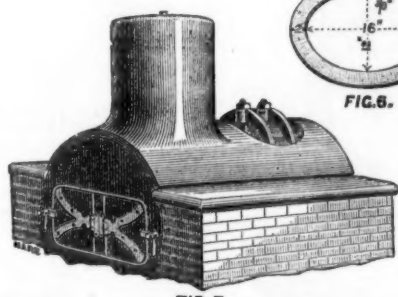


FIG. 5.

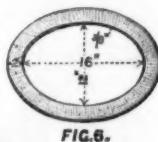


FIG. 1.



FIG. 2.



FIG. 3.

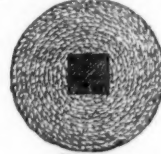


FIG. 4.

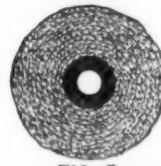


FIG. 5.

**BELL'S ASBESTOS BOILER COVERING COMPOSITION** (Fig. 5), for Coating the Pipes and Boilers of every kind of Marine and Stationary Engine. Non-combustible, and easily applied when steam is up; adheres to metals and preserves them from rust; prevents the unequal expansion and contraction of boilers exposed to weather; covers 50 per cent. more surface than any other coating, and is the most durable material of its class.

The composition is supplied dry, and is only to be mixed with water to the consistency required for use.

The following Testimonial refers to the Asbestos Boiler Covering Composition:—  
The Maxim-Weston Electric Company (Limited), 29, Bankside, London, S.E., Mr. John Bell, 118, Southwark Street, S.E. Jan. 4th, 1883.

DEAR SIR,—In answer to your request, I beg to inform you that I find the thermometer placed 3 ft. above the boilers now stands at 92°; before your covering was put on it used to stand at 126°. With regard to the saving of fuel, I am unable to speak very accurately, as the boilers were not working long enough before being covered to ascertain the amount of fuel that would be consumed in an ordinary run; but I feel quite justified in saying that we burn less by about 5 cwt. per night than we were doing, and I shall be glad at any time to show the boilers to anyone who may wish to see them, as I consider yours the best covering that I have up to the present seen.

Yours faithfully,  
(Signed) J. H. CUNDALL, Works Manager.

**BELL'S ASBESTOS and INDIA-RUBBER WOVEN TAPE and SHEETING**, for making every class of Steam and Water Joints. It is the most efficient material for making bilge water pipe joints. It can be bent by hand to the form required without puckering, and is especially useful in making joints of manhole and mudhole doors; also for large "still" joints where boiling fat and steam have to be resisted. It is kept in stock in rolls of 100 ft., from 1/4 in. (Fig. 6) to 3 in. wide, and any thickness from 1/16 in. upwards. Manhole covers can be lifted many times before the renewal of the jointing material is necessary.

The same material is made up into sheets about 40 in. square, and each sheet bears my Trade Mark, without which none is genuine.

The engineer of a world-renowned firm writes:—"There is not, nor can there be, any doubt as to the excellence of your Asbestos and Indiarubber Woven Sheet—as a jointing material it is unrivalled."

The engineer of a large colliery writes:—"I would in all candour say that your Asbestos and Indiarubber Woven Sheet is first-rate for joints. In my 25 years' experience I have not seen anything like it. I highly recommend it to all those who have to do with steam engines."

It is very necessary to guard against imitations of this useful material, and to secure themselves against being supplied with these cheaper articles at my price, users are recommended to see that every 10 ft. length of the Asbestos Tape purchased by them bears my Trade Mark.

**BELL'S SPECIAL LONDON-MADE ASBESTOS MILLBOARD**, for Dry Steam Joints, made of the best Asbestos fibre, is well-known for its toughness and purity, and is absolutely free from the injurious ingredients frequently used to attain an appearance of finish, regardless of the real utility of the material. Made in sheets measuring about 40 in. square, from 1/4 in. to 1 in., and 1/2 millimetre to 25 millimetres thick. Each sheet bears my Trade Mark.

Engineers and others in charge of Machinery are invited to inspect BELL'S ASBESTOS GOODS at any of the undermentioned addresses, or to write for particulars.

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"Herberton Advertiser" Office, Herberton, September, 1882.

**T. C. KITTO,**

PRACTICAL GEOLOGIST AND MINING ENGINEER

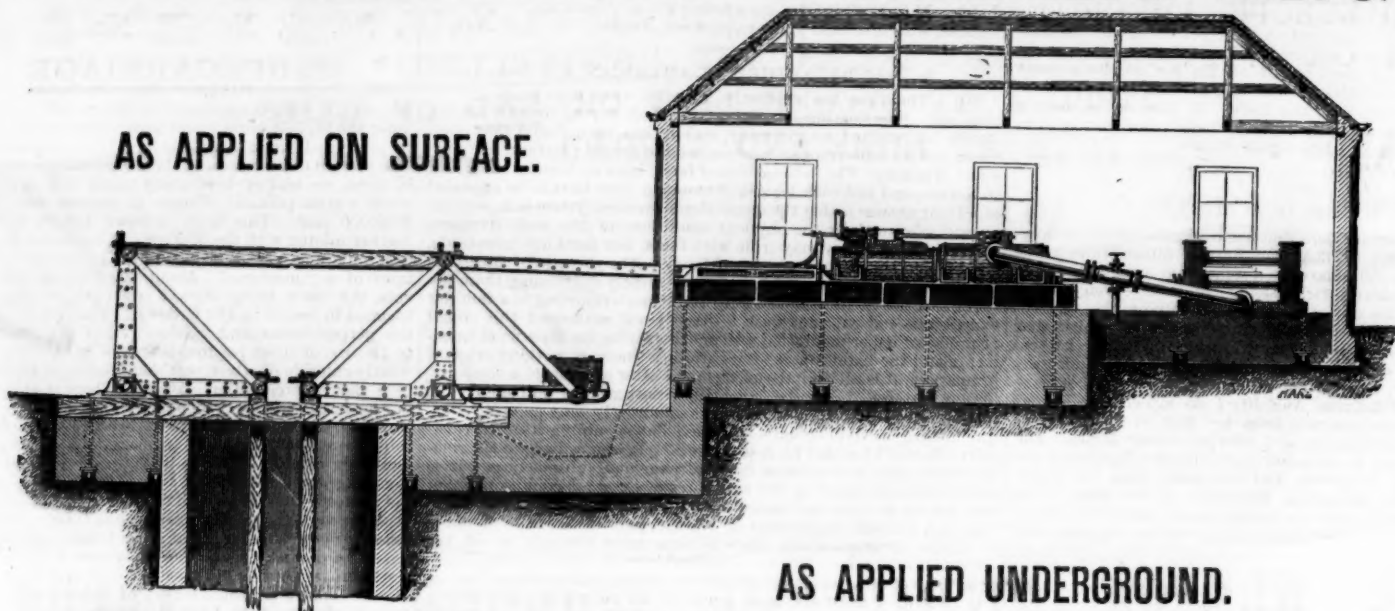
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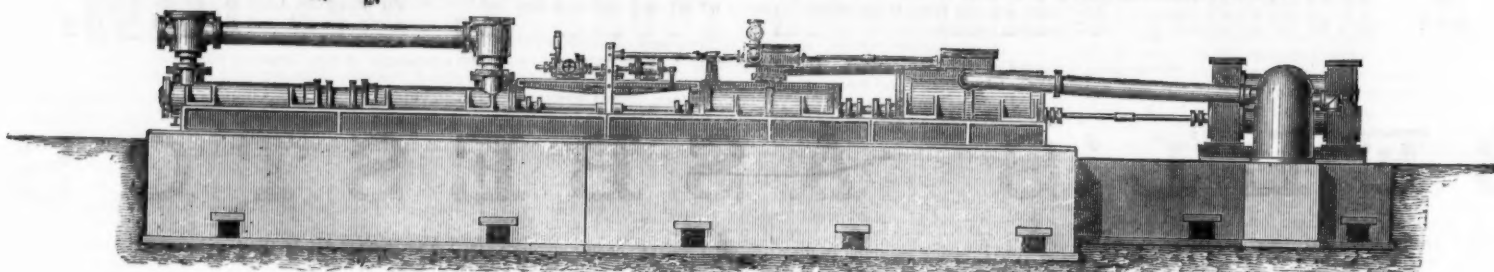


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AS APPLIED ON SURFACE.



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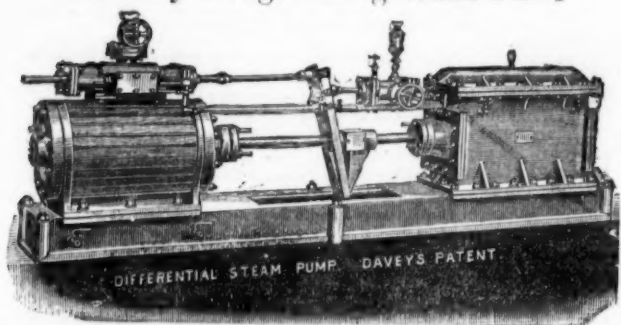


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The only Self-governing Steam Pump.



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## PRICE LIST.

Diameter of Steam Cylinder, Inches.	Diameter of Water Cylinder, Inches.	Length of stroke, Inches.	Gallons per Hour.	Height to which water can be raised with 40 lbs. steam pressure, Feet.	PRICE.	Price with Condenser, in Suction Pipe, £.	Price with Air Pump Condenser, £.	Diameter of Suction and Delivery Pipes, Inches.	Diameter of Steam Pipe, Inches.	Diameter of Exhaust Pipe, Inches.
10	5	15	5,200	250	65	72	85	53½	1½	2½
10	7	15	10,400	130	70	80	100	6	1½	2½
10	9	15	17,300	70	85	100	120	4½	1½	2½
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12	8	24	13,500	140	100	114	142	7	2	2½
12	10	24	21,300	90	120	136	175	5½	2	2½
14	7	24	10,400	250	110	130	156	5½	2½	3
14	8	24	13,500	190	120	145	165	6½	2½	3
14	9	24	17,300	150	130	150	172	6½	2½	3
14	10	24	21,300	120	140	162	190	7½	2½	3
14	12	24	30,800	80	160	190	216	9	2½	3
16	8	24	13,700	250	140	170	195	6	3	3½
16	9	24	17,300	200	150	180	215	6½	3	3½
16	10	24	21,300	160	160	196	225	7½	3	3½
16	12	24	30,800	110	180	220	246	9	3	3½
16	14	24	42,000	80	200	242	264	10½	3	3½

## R. S. NEWALL AND CO., SOLE PATENTEES OF UNTWISTED WIRE ROPE.

Iron and Steel Ropes of the highest quality for Collieries, Railways Suspension Bridges, &c.

PATENT STEEL FLEXIBLE ROPES AND HAWSERS.  
IRON STEEL, AND COPPER CORDS. LIGHTNING CONDUCTORS.  
COPPER CABLES of high Conductivity for Electric Light and Power.

London: 130, STRAND, W.C. Liverpool: 38, WATERLOO ROAD.  
Glasgow: 68, ANDERSTON QUAY.  
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## INCREASED VALUE OF WATER-POWER.

### MacADAM'S VARIABLE TURBINE.

This Wheel (which is now largely in use in England, Scotland, and Ireland) is the only one yet invented which gives proportionate power from both large and small quantities of water. It can be made for using a large winter supply, and yet work with equal efficiency through all variations of quantity down to a fifth or even less if required. It is easily coupled to a steam-engine, and in this way always assists it by whatever amount of power the water is capable of giving, and therefore saves so much fuel.

This Turbine is applicable to all heights of fall. It works immersed in the tail-water, so that no part of the fall is lost, and the motion of the Wheel is not affected by floods or back-water.

References to places where it is at work will ven on application to—

MacADAM BROTHERS AND CO.,  
BELFAST.

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The IRON AND COAL TRADES REVIEW is extensively circulated amongst the Iron Producers, Manufacturers, and Consumers, Coalowners, &c., in all the iron and coal districts. It is, therefore, one of the leading organs for advertising every description of Iron Manufactures, Machinery, New Inventions, and all matter relating to the Iron Coal, Hardware, Engineering, and Metal Trades in general. Offices of the Review: 342, Strand, W.C.  
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EDGE TOOLS, HAMMERS, PICKS, and all kinds of TOOLS for RAILWAYS, ENGINEERS, CONTRACTORS, and PLATELAYERS  
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## DYNAMITE, GUN-COTTON, AND PATENT ELECTRIC FUSES,

FOR MINING, TUNNELLING, SUBMARINE, AND ALL KINDS OF BLASTING OPERATIONS.

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## Original Correspondence.

## TIN IN SOUTH AUSTRALIA.

SIR,—When in London last week I inspected the large blocks of black tin ore from South Australia, mentioned in the *Mining Journal* of Sept. 15. They are the finest specimens of that description of ore that I have ever seen; one of the stones weighs, I should say, about 1 cwt., and probably contains about 20 per cent. of black tin; the average would, I should imagine, run about 15 per cent. The matrix is a friable quartz, mixed with a large percentage of talc that would be very easy to crush and dress. Two lodes are said to be 8 to 10 ft. wide; that has been traced on the surface for a great distance. In one part the lodes are standing 9 ft. out of the ground, which looks as though they were true lodes. If this be so there is no doubt it is a very valuable discovery, and will no doubt lead to the finding of other lodes in the neighbourhood.

Menheniot, Liskeard, Oct. 4.

WILLIAM HANCOCK.

## SILVER MINING IN AUSTRALIA.

SIR,—As there is a rumour here that some speculators are arranging to try and either sell or float the Barrier Silver Mines in the London market, and as there have been some very exaggerated reports about the "wonderful richness" (?) of them—even bruted about here (with the like object possibly)—I subjoin the Government (New South Wales) Inspector of Mines' report on them, so that the readers of the *Mining Journal* may know beforehand the real nature of the property and its prospects. The report is addressed to the Under Secretary, Department of Mines, Sydney, and says:—Barrier Silver Mines, Wilcannia, Aug. 10: I do myself the honour to inform you that I have returned from my tour of inspection of the Thackaringa, Umberumberka, and Sinclair Silver Mines. The Thackaringa Silver Mines are situated on the Barrier Ranges, about 190 miles south-west of Wilcannia, and five miles from the South Australian borders. The geological formation of this part of the Barriers consist of felspar, quartzite, porphyry, and micaceous schist, and with the exception of a few lodes which occur in porphyry, the silver lodes so far discovered occur generally in the micaceous schist formation. The latter formation can be traced for several miles in a north-east direction, being intersected or cut off by hard bars of felspar and quartzite. Most of the veins run very flat, dipping or underlying not more than 1 ft. in 6 ft., which is not a good sign for permanency. The veins vary in thickness from a mere thread to 2 ft. Their strike is in all directions of the compass, as in some of the mineral holdings a perfect network is observable on the surface; the tract of metalliferous country has a north-east strike, and it is most probable that as depth is reached north-east will be the strike of the most permanent lodes on the Barrier. I think it will be found when these silver deposits are more systematically worked that they are not continuous, but shoots or blocks of ore going down a certain depth, and trending along the line of lode a certain length, and then pinching out, or building and pinching, as depth is reached; but miners should not be discouraged by these features, but sink and drive for fresh blocks or shoots of ore.

The principal mines at work at Thackaringa are the Hercules, Homeward Bound, Dan O'Connell's, Garrott's, Hillier's, Kingston's, McGrath and Collins, which are sinking on the underlay, where the walls are better defined, the lodes not lying near as flat, and showing a better promise of permanency. The deepest shaft on the whole field is about 70 ft. from surface. With the exception of the few mines above mentioned, a system of scratching, or, to use a miner's phrase, pigrooting, has been carried on, which will in future cause extra expenditure to secure and systematically work these mines. By indications on surface, and to the greatest depth yet reached, it seems to me that these mines have been over-estimated as to their value. There is, however, sufficient ore in sight which, with sound management, might produce payable results for years to come. At present the whole of these mines are worked in a very primitive manner. The Thackaringa silver ores (samples of which I forwarded to the Department of Mines) consist of galena, antimonial galena, cerussite, anglinite, with a small percentage of chloride, sulphide of silver, and antimonial and arsenical silver ores. The ore is not treated in Australia, but bagged and forwarded, via Adelaide, to England, about 700 tons having been dispatched from the mines, and at the time of my inspection there were still 350 tons at grass.

The cost of carriage and brokerage from these mines to England has been about 8½ per ton; the carriers, so far, have taken the ore from the mines to the Terrowie (South Australia) Railway Station for 4½ per ton. I was informed that returns to hand from England have proved the value of the ore from 16½ to 23½ per ton; but that the first ores shipped to England from which the returns are to hand had been of inferior quality. The metalliferous country at or near these mines has been taken up in 40-acre blocks, either by application for lease or mineral conditional purchase, for more than 3 miles in north and south directions, and fully 2½ miles in east and west directions. The population, roughly estimated, is about 200. Miners with their families should hesitate, for the present at least, before going to these silver mines, unless well provided with ample means to protect themselves and their families against the hardships and privations they will undoubtedly have to undergo. The nearest water for domestic or stock purposes is in private tanks, about 7 miles from the mine; the price for water at the mines is 2½ per 100 gallons, and, should the present influx of population continue, a repetition such as witnessed in the earliest days of Mount Browne gold fields—fevers, scurvy, dysentery, and great privations—might be expected. There are more than sufficient miners on the ground until the labour conditions of the mineral holdings can be enforced. For water supply there is a good site, with large catchment, within one mile of the mines, on Crown lands, on which a large tank could be constructed. A copper deposit has also been discovered by McGrath and party in close proximity to the silver ores; 5 tons of the copper forwarded to Adelaide 12½ per cent. The ore shows in a short bunch, about 20 ft. along the surface, and consists of green carbonates, black oxides, and small percentage of grey ores.

The Umberumberka Silver Mines are situated about 12 miles north-east of Thackaringa as the crow flies, but 18 miles by mail track. Umberumberka was the scene of a former gold rush to the Barriers in 1867, when several lives were lost. Here the same geological features as at Thackaringa present themselves—micaceous schist being the silver-bearing rock—the lodes mainly consist of cerussite, anglinite, and chlorides, and contain less galena than those at Thackaringa. The Umberumberka Silver Mining Company's Mine, which is the principal mine on this field, has a shaft down to the depth of 60 ft., and still sinking. At the depth of 45 ft. the lode had pinched out, but at the time of my inspection the lode in the 60 ft. level was fully 2 ft. wide, showing good ore, samples of which I forwarded to the Department of Mines; 250 tons of ore have been dispatched from the mine, of which 50 tons have reached England. The mine is worked in a practical and systematic manner. Some good ore has also been obtained in Stokies and Garrott's, in Crisp's, and one or two other mines, samples of ore of which I forwarded. Umberumberka is better supplied with water than Thackaringa, there being two private wells near at hand. A police station is in course of erection, and there is a good site and all requisites for a permanent township, which by force of circumstances (Umberumberka being on the main road from Wilcannia to Adelaide) it is likely to become.

The Sinclair Silver Mines were discovered within the last fortnight by a miner named Sinclair. They are situated about nine miles north-east of Umberumberka, in the micaceous schist formation. Here, too, like all the silver or other mineral deposits in the Barrier Ranges so far found run in shoots or blocks. The ore appears to be of good quality, and has been found in a north-east and south-west direction for about two miles, and about one-quarter of a mile in width. The Sinclair Mines are as yet only surface working. The population of Umberumberka and Sinclair is about 100. The tract of metalliferous country commences within five miles of the South Australian border, trending north-east for over 25 miles (as far as at present discovered) as the crow flies, and is likely to continue in a north-east direction to Llangewira and Gnalta, but should

silver ores be found at the latter place it will have to be of high quality to pay; the greater distance to market will cause a larger expenditure. A rumour was current here that rich silver ore had been discovered near Llangewira, but on my return trip I came near the station, and by enquiries made found the rumour to be incorrect.

W. H. J. SLEE, Inspector of Mines.

I may add that Mr. Slee is a most painstaking, conscientious, and well-informed officer, and his facts are likely to be "facts," and reliable ones; also that hitherto the only two known strongly defined silver-bearing lodes are respectively in the New England and Moruya districts of this colony, the latter being also gold bearing, but strongly blended with arsenical pyrites.—Sydney, August.

R. D. A.

## A NEW DEPARTURE IN AMERICAN MINING.

SIR,—The time has evidently gone by when high prices can be obtained. The floating in aerial regions and paying roundly for the luxury has resulted unprofitably, and it has been found that *terra firma* and its subterranean recesses are the proper platform and province of mining. The delineations of fancy have no foundation or root in Nature, and bed-rock logic and common sense have to be appealed to. Their answer is that the metalliferous venous system is dependent on and governed by the physical conditions of the rock structure they inhabit. Fancy may trifle with facts, but facts are inexorable, and change not at the caprices of fancy. The rhetoric of imagined conditions may be more pleasing, more widely engrossing, than the sober realities of stern facts; but, what then—resorting to a familiar expression—"it will not wash"—it will not withstand the ordeal of practical experimentation without betraying its superficial lineaments and the baselessness of its origin. There is nothing original in imagery, it is all imitative; it takes after a pattern, a combination of patterns, it may be, but still a pattern; its outcome is the rendering of imperial or subservient fancy. It may paint or portray mining in vivid colours—it does; but is mining itself intrinsically affected by either process or both? It is not, beyond the relative effect they may exercise externally on motive influences. It is inherently unaffected by the attributes of external conditions other than labour and the mechanical appliances of its production. It relates to a realistic department of Nature, part of a realm of many provinces, amongst which there is none more abstruse or—if the attributes of sentient life were applicable to it—more conservative or selfish; it tenaciously holds to its treasures, and yields not but to the invasion of resistless force, governed by unwritten laws utterly unknown but from their effects, little of which are visible except in general outline.

The search for the hiding places of the treasures of earth involves a conflict with natural laws and intellectual science, with no other guides but analogy and hieroglyphic characters—an accredited alphabet, of which latter has scarcely yet been written, and if written not generally acknowledged. Analogy, therefore, is the leading guide, assisted by the often obscure and frequently colourless rays of almost undistinguishable light—the light of natural lineaments, characters, and figures. In pursuance of this subject I propose to proceed on the plane of analogy as my chief guide, not only as to practical mining, but the subscriptions of men relative thereto. Imperiousness of human will—conceit, if the term is preferable—has sometimes and not infrequently as much to do with the ill-success of mining as the most vivid colouring of fancy pictures, as deviation from truth in whatever direction leads to error, and in proportion as the speed is accelerated in this or that direction. Following analogy knowledge is necessarily limited, not to individual experience, but to that and the properly understood and properly appreciated experience of others. In this, however, it is not singular—all knowledge being limited, because restricted to certain objects or parts of objects, or certain pursuits, achievements, or attainments—whilst all beyond comparative competent knowledge is speculative and positively uncertain. Analogy is not perfect, because it reasons syllogistically—it theorises; but it is like theorising on alphabetical characters and syllables to divine the meaning and import of words, what they signify or symbolise—from what is known of similar occurrences under similar conditions—in other portions of Nature's volume in this department and their practical disclosures. Experience has established the fact that certain conditions are necessary to produce certain effects. If the primary or contributory conditions, causes, or any of them are absent similar effects cannot be expected to result as if they were all present. The most prolific, most enduring, and most reliable sources of metallic wealth are found to be fissure veins cutting through various classes of rocks, and extending far down in their embrace, and that such veins are least ostentatious of superficial display at or near the surface, and invite attention more from the analogy of previously acquired facts than from any florid intimation of the treasures they contain. If faith in the analogical rendering of individual judgments in such cases be withheld those vast sources of invaluable treasure must remain undeveloped and unrealised, and be to mankind, for whose benefit and convenience they were intended, as though they existed not.

The new departure referred to at the commencement of this letter is with respect to this country particularly, and to the wisdom of experience during the years which have elapsed since my first visit here, and subsequent departure in 1872. Immediately on arriving in this part of the country I proceeded, as per instructions of the company by whom I was engaged, through several districts successively of this and adjacent counties, and almost every man I met owning a mine or mining claim was a millionaire in imagination—the name of whose fraternity was legion. Some of the districts comprised a network of veins, and almost everyone of them was a separate location. In some instances many locations were made on branch veins of only a few inches in width, and a few feet apart from each other, one of which very frequently converged to the other longitudinally and in depth, so that in a short distance they would conjoin, and then would come the tug of war, or rather the tirade of war—for there was generally much more words than works in respect of such collisions—as to which was the first or older location, though each knew one as well as the other which was. It usually ended in words if there was nothing of value to fight about; but if there was a legal tussle would ensue, in which legal luminaries would engage with no other prospect, on one side at least, of obtaining their fees but by black mail. Some lively scares were enacted at these times both in courts and out of courts; but time works wonders in this as in all other respects. All that is changed now—an imaginary millionaire is as rarely to be met with as it was then to meet a mine claimholder that was not one. The fraternity has subsided; those of it who are still extant have retired, through the inveterate lessons of experience, to the regions of common sense, and have either betaken themselves to some other vocation or exercise their faculties and functions in the prospecting and location of mines, with enlarged ideas as to their requisite extent lengthwise and transversely. Many a prospector of those early times has bitterly lamented his infatuation and folly from having rejected liberal offers for properties which soon after fell into disrepute before the light of advancing knowledge and their own inanity. There has been another change no less vital and important to the success of mining—the Federal Legislature has interposed laws giving to each individual discoverer and locator of mines 1500 ft. in length of the lode, and 300 ft. in width on each side of it, together with all other lodes contained within such limits—an area of upwards of 20 acres of ground—which is the maximum allowed by law for one location. If additional ground be desirable in the interests of a company another or other locations may be made consecutively and worked conjointly or otherwise, as subservience of economy may dictate; but if such desirable adjuncts be already engrossed as the property of another or other parties satisfactory arrangements can usually be made by amalgamation of the properties prior to their transference to a company on terms agreeable to themselves. Another change not less vital to the full success of mining is the terms on which valuable properties may now be obtained in this country.

Instead of demanding enormously high rates as in the early times mines of equal or surpassing value can now be had by *bona fide* companies for the working—that is, per royalty or a modest share-interest of the properties. The improved and vastly more economical methods of reducing the ores to bullion is another almost incalculable

improvement in favour of Nevada silver mining. It would seem from this and the exuberance of Nature's provisions throughout many portions of the State that the term failure in respect of such enterprises may be eliminated from its nomenclature; it certainly may be if judicious selections be made. Let all extravagant notions be discredited and discarded respecting fortunes being made in a day, and a descent made to the calm regions of business, its stimulating and governing principles be espoused, and mining in this country in the manner I have stated will result in profits compared with which no other class of mining proportioned to the outlay could approximately emulate or equal.

Ione City, Nye County, Nevada, Sept. 16.

ROBT. KNAPP.

## MEXICAN MINES, AND BRITISH CAPITAL.

SIR,—During a recent trip into Old Mexico I found what I, with almost 25 years' experience in mines and mining (I am 50), consider the biggest mine I ever saw. This mine has been worked for 20 years, and over \$11,000,000 have been abstracted from it in silver. The present owner is one of those Mexican politicians who are always in debt, no matter how many mines they own and work. He is about a great political scheme at present, and offers his mine for \$300,000 cash. This mine is down 450 ft. to water, which settles further mining with the Mexican, as he cannot get rid of much water in a mine, and has not been able yet to overcome the dread he entertains of a "machina." About 700 ft. have been stoped out on the vein, the claim being 2600 ft. in length, so that 1900 ft. are yet untouched in length to 450 ft. down. The vein inclines about 32° from the perpendicular, and carries 9 ft. of ore, which is worth from 50 to 150 ozs. of silver per ton, is free of all refractory elements, being mostly chloride of silver, soft and friable, so much so that the Mexicans have scarcely used powder. There is at least 20 ft. of gangue matter in the crevice, which the Mexicans have thrown out or left standing, and which is worth at least \$30 per ton. A block of 8000 tons of ore, around which I measured up, is yet standing in the old workings exposed. The old dump of the mine, according to my sampling, is worth \$500,000.

I do not wish to trifle with this splendid mine, and, therefore, come at once to England for the capital. The Yankee will trifle and scheme, and make a mess of it, as I have experienced to my sorrow dozens of times. In this case only cash will buy the mine, but if a syndicate were formed to raise \$300,000, and will empower me, I would at once make a thorough survey of it, sample the mine thoroughly, and obtain complete maps and evidences as to the mine's condition and value, ore in sight, and its dump value, all in proper and legal shape, and will buy the mine for the syndicate. After my thorough examination I can tell exactly what mode of treatment the ore needs. I think, however, a stamp mill of 40 stamps will be the thing, yet the evidences may occur upon a thorough investigation that also a smelter is necessary, as there is a large vein of argentiferous galena in the mine, to which I, however, did not give much attention, being almost overwhelmed with the great masses of chlorides in sight. With the mine go 14,000 acres of land, or the whole "hacienda."

I have worked among the Great Leadville Mines. I have seen the Comstock Mines in their palmiest days. I have seen the Bassick Mine, the Great Tombstone Mines, and others in Peru and Chili, but I have never seen so much good ore exposed to view as in this mine. The Mexicans only extract between 45 and 48 per cent. of the silver in the ore, as their slag piles, of which I have made assays, prove. The mine, as I have stated, costs \$300,000, to which must be added machinery for sinking, and pumping, and working this mine and tramway, \$100,000, and mill \$100,000; together, \$500,000, so that 100,000½ will set this mine up into dividends after a month's work has been done of ore extraction. The mine is 15 miles from railroad, by which timber from California, coke, and coal for fuel, and all other supplies, can be got to the mine reasonably by building 15 miles of 28-in. tramway with driving engine between railroad and mine.

If the English want this mine the syndicate must be formed at once as the mine will not lay there long before some acute Yankee will have it in his clutches. My excuse, as I said before, for coming to England is, that I have only experienced bad and trouble with Americans in the mining business, and will not deal with them any more, and I have been too long upon this continent to have friends and business connections any more in England and Germany, and thus am forced to go to you, as I am a constant reader of the *Journal* and know that the *Journal* has great influence in mining circles. I have heretofore worked singly, but this mine is too big for me, and I must go to capital for help.

Denver, Colorado, Sept. 16.

CHARLES WULSTEN,  
Civil and Mining Engineer.

## AKANKOO MINING COMPANY.

SIR,—In the *Mining Journal* of Sept. 29 appeared under Notices to Correspondents "Corrigenda" (Akankoo) has not sent name and address. Assuming that would be rectified the following week by name and address and a letter, I have been hoping to see a refutation of the accuracy of the allegations, in part at least, contained in Mr. Ross's valedictory letter of Sept. 17, which were so serious as to elicit presumably an indignant denial, if baseless. They are opposing views held by the shareholders of this company, one body looking hopefully for a good, substantial, crushing, and commensurate dividends by Christmas, which they believe from their hearty subscription of calls, patience they have displayed, and from the statements of the management, they have every right to expect, while the views of the other body (a growing one) are very well gathered by the following remark in the *Journal* of last Saturday—Akankoo are quoted at ½ to ¾, but appear unsaleable at any price. Much turns upon the change of management, and not a spasmodic remittances of little bits of gold quartz or micaceous sandstone, as the case may be, something also may be learnt from the following facts as to the course advisable.

In January last, after the meeting of Dec. 9, a promise made to me prior to the meeting that a firm of mining engineers, already interviewed, should be called in to advise on our then serious position, which has been most amply set forth before the board verbally, and also by writing from time to time. I on one occasion saw Mr. Lane and the board together, and asked Mr. Lane in their presence, owing to the extraordinary views he entertained of mining, in what mine he had ever seen mining operations or been employed? Failing to get a reply I wrote to the board a specific letter as to Mr. Lane's testimonials, and on March 22 last received an answer "That the directors considered that they would not be justified in giving copies of the testimonials referred to without Mr. Lane's permission, and that they are surprised you should have made such a request."—Signed, C. E. Long, secretary.

I have since learnt that they had not then, and up to a very recent period, had not succeeded in finding any such testimonials, or copies of testimonials, in the office of the company, and that no director, unless the Chairman, had ever seen them with regard to the property. Mr. Lane has since informed you, Sir, by a letter from Axim, that there was no other vein than the vein then and now being developed (see his letter, which appeared in the *Mining Journal* of July 22). At that date and some time before Mr. Ross had in London, or on the way here, 17 specimens from as many different reefs he had examined on the property during his enforced inaction at the coast, which he utilised in prospecting. Those specimens are at the present moment in my possession. The directors, for, no doubt, to their all-sufficient reasons, declined to see Mr. Ross, his specimens, or his report; the report he, however, subsequently at my desire sent in. All Mr. Ross's statements appear, so far as can at present be tested, wonderfully accurate. Mr. Lane's I leave to the opinion of the shareholders, who can, perhaps, best appreciate them after the board, who, I am told, are now willing to find a Jonah and do their best for us on the old terms. Mr. Ross, in July, 1881, as you are already aware, pronounced the Ponsonby Hill a blow-out, and certainly from Mr. Lane and Capt. Martin's reports it so appears to be, whatever the cause on further investigation may be found to be. I trust the shareholders will divert the fees now sadly required for mining purposes, take up the reins, and commence real earnest mining, which all miners who have seen our property, declare will well repay our efforts. We have



come to our last call. Let no more specimens allure us to part with it in amateur mining.

In addition to the many specimens Mr. Ross brought away, he also brought a thorough conviction of the great value of the property, which although not in his opinion as in Mr. Lane's, "the first mine in the world," is still a very valuable property, unsurpassed for speed and cheap development. Our last meeting was held in December. Two meetings at least, according to the Articles, shall be held yearly. A flood of light will be let in upon our position, and the contending facts I do not doubt by the perusal of the correspondence of the last three months between the board and the manager. Duty imposes on the board the summoning of a meeting, while silence appears no longer dignified.

W. GETTING.

#### MINING NOTES AND RECOMMENDATIONS. (INDIAN GOLD MINES.)

SIR,—A few weeks ago I drew attention in the *Mining Journal* to the low prices of Indian gold mines, and the great probability of success of some of the companies. A few years ago, as is well known, these shares were in great request, and stood at high premiums, while the properties were quite undeveloped. The field, in fact, was an entirely new one for mining adventure. There was a rush of capital, much excitement, and then with some of the companies entire collapse through extravagant expenditure and injudicious management. The excitement has long since passed away, and the shares have been greatly neglected, because results were not attained at once. This is contrary to the true spirit of mining. It is proverbial that mining requires time. There are home mines only attaining success now after being worked at a loss for many years. West Kitty is a notable example of this, and it is now acknowledged to be one of the finest properties in Cornwall. The best gold mines in Australia were abandoned 20 years ago, when surface mining was exhausted. Capitalists reopened the workings, and sunk to greater depths, and made fortunes. The richest gold mines are worked to a depth of 1000 and 2000 ft. It has always been held that in depth the Indian mines would prove highly remunerative; this belief is now being acted on, and operations accordingly carried out. Pronounced success may at any moment be attained, when former, if not higher, prices would rule. I have before pointed out that the success of one mine would give an impetus to mining enterprise in India that would exceed all that gone before. There are those interested in Indian mines who are fully convinced of ultimate success, and when the turn of the tide comes these capitalists will reap the rewards. A true miner will see the whole business out, and not give up when appearances are discouraging. This is where the public err by throwing their chances away—buying at high prices and selling at low ones instead of reversing the tactics. The best mines have gone through times of depression, and the shares seen low prices. An opportunity of buying at the smallest risk, with great chances of large profits, is presented in Indian gold mines. The investments suggested are Indian Consolidated, South-East Wynaad, Devala Moyal, and Rhodes Reef. An advance to former prices would show a profit of 900 per cent. Such a thing is not at all unlikely, indeed it would only be mining history repeating itself.

Market operations alone will often influence mining shares 100 per cent., which of itself would be a handsome profit, if the investor had to wait a few years for it. The largest profits are made in mining by buying these low-priced shares and looking them up. Indian Consolidated (now including Indian Phoenix) has an area of four square miles, and the cultivation of coffee and cinchona, which will in time prove a revenue in itself, is being vigorously carried on, and there is about £60,000 cash in hand for developing the properties. At the least, this would carry them on for four years if no returns whatever were made, either from the mines or the natural products. Mining in this company is confined to the Phoenix portion of the property. The last clean up showed 72 ozs. of gold, and succeeding will be greatly increased; the next clean up is expected to be 150 ozs. As depth is attained it is believed that the quartz will greatly improve in value. South-East Wynaad have practically no money; but they have a very fine estate, about four square miles, and from the cultivation of cinchona alone profits may be expected, to say nothing of the mineral riches. Devala Moyal is another very fine estate; the company has about 40,000l. in hand for improving their property, the prospects exceedingly good. Rhodes Reef is absolutely a mining property; at the end of 1882 they had a balance of 40,000l. in hand, and their expenses may be put down at 10,000l. a year. In all of these properties sinking operations are going on, so that they will be thoroughly tested. There is no likelihood of immediate collapse, the prospects are good for mining, the estates an investment in themselves, and efforts are being put forward to prove and make them profitable.

GABBOTT AND CO.

#### CALLAO BIS GOLD MINING COMPANY.

SIR,—As many readers of the *Mining Journal* are interested in the Callao Bis Mine, and as they probably have not access to the Venezuelan journals, I send you herewith a copy of El Bolivarese, of Aug. 30, which contains the expression of Señor Liccioni's belief that the El Callao lode runs through the Callao Bis estate. The present manager of Callao Bis, Mr. G. Volveider, was one of the original proprietors of El Callao, and from the high terms in which Señor Liccioni writes of him it is evident that the Callao Bis shareholders may confidently expect a speedy announcement of the striking of the celebrated El Callao vein.

A. B.

Figtree-court, Oct. 5.

The correspondence in the Bolivarese is between Messrs. Vicentini and Co., the agents at Ciudad Bolivar of the Callao Bis Company, and Mr. Antonio Liccioni, the Chairman of El Callao Mining Company. The general character of Messrs. Vicentini and Co.'s letter and questions will be understood from the subjoined extract from Mr. Liccioni's replies. He says—"I have known Mr. Guillermo Volveider many years. On Jan. 8, 1870, he was one of the founders of the Callao Company, as may be seen in the acts of inauguration and legalisation of the said company. When the company was formed he had been for many years one of the most distinguished miners there was in all the Territory. He is a man of the most irreproachable honour, possessing a character for honour and independence in the highest degree, being a mining captain at El Callao, and the owner of a share in the company, he resigned the post of captain and sold the share, which now would be worth a large fortune to him. . . . I firmly believe that if the Callao Bis Company had confided its works to Volveider from the beginning, it would now have struck the Callao lode, if it passes, as I believe it does, through the Callao Bis concession, and would not have spent a quarter of the money it has expended—that is to say, it would not have set up machinery nor erected large dwelling-houses before having assured itself of the existence of the lode in the concession. All the works that have been done to get at the lode are inferior to what more than 50 corporals I have had in my service for 12 years would have done. I believe that Volveider is very competent to direct the drifting or cross-cutting that may lead to the Callao lode if it should pass through the Callao Bis property. When the lode is found the company can send out a scientific manager to superintend the whole of the working and the administration. . . . You tell me that Mr. Nicholson asked Mr. Oxland, superintendent of El Callao, to give him a report as to Volveider, and that Mr. Oxland replied he had discharged him a few months ago from our company's service owing to his being very insubordinate. I have already stated that Volveider vaunts his honourableness and independence of character. Whereas he ought to have been a rich man, he is poor by reason of character; but he submits to toil and fulfils his duties. I gave him a post of confidence in the company, but it was not to the liking of Mr. Oxland, and he did not discharge him, because he could not do so, as he was appointed to the situation by the board of directors, and he might have continued in it, but finding that he was not liked by Mr. Oxland he did not care to return. Looking to former services, the board gave orders that he should receive his pay, though Mr. Oxland would not give him work, but he declined to do so.

You say that Mr. Nicholson, amongst other evil reports he has given against Volveider, states he is an agent of mine. I do not know what he means to say by that, but I can tell Mr. Nicholson

and all the companies in the world that I have no agents save in the path of the strictest honour, and that if Volveider were an agent of mine it would be a great recommendation both for him and for me."

#### PROSPECTS OF INCREASED GOLD SUPPLY FROM NORTH CAROLINA.

SIR,—A few weeks since you inserted in the *Journal* a description of my patent wave-plate amalgamator, as promised in a letter I sent you in June last. I now give you the results of some trials that, through the kindness of Mr. Clayton, I was enabled to carry on at the Conrad Hill Gold and Copper Mines near here last week. The amalgamator is regularly working there. The first trial was by placing the amalgamator in such a position that the crushed ore and water from five stamps should pass over three copper plates, and then into the amalgamator. The result was that gold was caught in it that otherwise would have been lost.

The next trial was with roasted ore that had always been difficult to treat. In this trial the plates were removed, and the pulp was taken direct to the amalgamator, and then passed to the buddle. In the next battery of five stamps the same ore was fed, and it passed over three plates, and then to the next buddle. In a 12-hours run 7 tons had passed through my amalgamator, and a like quantity over the plates from the next battery of stamps. The result was 6½ ozs. of amalgam from my amalgamator, as compared with 4 ozs. from the plates. Many tests of the tailings from each process were made during the trial. In every test of those that had passed through my amalgamator not the smallest speck of gold was ever found, whilst in the other buddle every test gave a quantity of coarse gold, which on the application of quicksilver, would not amalgamate with it till it had been rubbed with sand. This proves the truth of what I said in my small pamphlet that you kindly quoted. "It is generally believed that the crushed quartz is an obstacle to the amalgamation of gold, and this is so in all amalgamators where the ingredients brought together have not the free action that they have in the patent wave plate amalgamator; but experience proves that with a rapid movement it is of the greatest use in aiding, by roughening with its sharp surfaces the gold, and thereby enabling the quicksilver to take hold of it, which, when once done, they can only be separated in the retort."

It is impossible to have a more convincing proof of the value of the invention than these tests of the tailings from refractory ores. I was told by many persons of long experience with these ores that nothing could be done with them; but I had such confidence in the working of my amalgamator that I confidently stated my ability to save gold in any ores that could be put through it. In previous trials I always considered that ½ ton per hour was sufficient for an amalgamator of the size tried, but in these trials that was considerably exceeded. From first starting the machine it worked without a hitch, and with the exception of oiling the working parts it never received any attention or alteration during the trials.

I have trespassed too much on your valuable space, but the subject is of such importance to those engaged in gold mining, particularly in those places where the gold is fine and liable to float on the water, that I believe you will grant me the favour of inserting this letter. In a future letter I will give further particulars.

HENRY MOON, M.E.

Thomasville, North Carolina, Sept. 27.

#### THE GOLD MINES OF SPAIN.

SIR,—A few details concerning my recent Spanish trip may be of interest to readers of the *Mining Journal*, and may at the same time attract attention to an important mining district offering a good field for enterprise. I was at Ponferrada, in the province of Leon, Spain, at the beginning of August, and may state that between Astorga and that place the country rises until you reach Branuelas, where the altitude is 3125 ft. Here you leave the elevated tablelands of Leon and descend into the valley of the Sil and its affluents, which is 1500 ft. lower down. After the railway has shot through 13 dark tunnels and tied itself into a loop, like the Southern Pacific at Tehachapi, you find yourself in a different country, with semi-tropical vegetation, and a warm, pleasant, atmosphere. The altitudes are—At Granja, 2700; Rio Tremor, 2200; Torres, 2125; Bemibre, 1875; San Miguel, 1660; Rio Sil, 1420; bridge over same, 1450; city of Ponferrada, 1460 ft. above the sea. The distance from Astorga to Ponferrada is about 50 miles; the time by railway three hours. The country rock is mostly slate, topped in many places with cemented gravel. Until you descend into the lower country the hills, destitute of trees, are covered with furze. The cultivation is scant and poor. After reaching the lower country trees become more common, cultivation is more general, and the outlook greatly improves. The chief kinds of food obtainable are black bread, potatoes, onions, and pork, the prices being about the same as in England. Black home-spun woollen cloth, 4 ft. wide, commonly used to make peasants' clothing, but suitable for sluice blankets, costs 10 to 12 reals (say) 2s. to 2s. 6d. a running yard. Lumber must be brought from Norway or America; there is none in Spain. Nails and hardware must be purchased in England. Iron pipes, nozzles, giants, &c., must be procured in England or America. Hydraulic miners must be hired in California. The art of hydraulicing is little known elsewhere.

East south-east from San Miguel, distant (say) 2 or 3 miles, and about two-thirds high up the mountain on which it is situated, is the Roman quartz gold mine known as Castropodame. The size of the dump proves that the excavations are of considerable extent. The quartz is bluish-white. The mine is badly caved and filled with bats and adders, so I did not venture within, particularly as I had no ropes or ladders, and could find nobody who knew the mine well enough to act as guide. Both wolves and bears are seen on this mountain, and at night the former descend to the railway track and prowl about San Miguel station for food. About 2½ miles south-west from San Miguel and up another hill is the pueblo of Congosto—altitude, 2000 ft.; no water and no fuel except the roots of furze brush. About 1 mile south of Congosto is an old chestnut tree and a field of potatoes. The tree is 30 to 35 ft. in girth at the base and 23 ft. in girth a few feet above the ground. The potato field is a recent mining "location," called the Montana Rofa. The gravel is only a few feet deep, there is no gold in it and no water to wash it with; 300 ft. above the chestnut tree and about a quarter of a mile west of it rises a towering mass of slate rock, on the pinnacle of which stands the ruined convent of La Peña. From Montana Rofa to San Miguel by the highway it is exactly 2½ miles. About a mile from San Miguel and on the downward road is another mining "location," situated in a vineyard, also without gold or water. It appears to have been washed in very ancient times by means of a small stream that has since disappeared.

Ponferrada has a history which will be found in all the encyclopedias, and which therefore need not be here repeated. From Ponferrada my route lay across the valley of the Sil, and over the hills to the south-west until I should strike the Sil again at or near Carracedo. As we cross the River Sil the background of the scene before us from south-west to north-west is a semicircle of stony and sterile mountains, capped with snow, the latter fast melting under the summer's sun. Towards the south-west and in the direction of our road, but much nearer to us than the mountains, appear certain high banks of red gravel, the remains of a gold mine once worked by the Romans. Leaving these gravel banks on the right hand we prepare to ascend the hills. Presently we catch sight of the Castillo de Cornatel, a ruined edifice on a pinnacle of rock, once the abode of a company of Knights Templar, now the resort of owls and bats. The altitude of the road is hereabouts 1700 ft.; of the castle 2000 ft. Further on the road attains an altitude of 1925 ft., when it begins to descend. At this point we came in sight of the Sierra de Fernaldillo, the source of the River Cabrera. The highway we are travelling upon is one of the best I ever saw.

It is a macadamised road, with stone bridges over the streams, and stone buttresses where it overlooks precipices. There are stacks of broken stones at intervals ready for use when occasion demands, and road makers (usually soldiers on furlough) at work at every section, keeping it not only in thorough repair, but cleaning and ornamenting

it, so that no detail, however slight, escapes observation and attention. These road menders have a brass badge around their caps, which announce that they are peons de carretera. The road was built four years ago, and has already made a great change in the industrial development of the province. Before reaching Carracedo where I was to stop, the road is carried by a stone bridge over a cienaga, which was formed by the Romans by damming up a small stream that formerly flowed through here into the Sil. The object of damming the stream was to form a lake near Carracedo, and the lake was used in booming away the debris from the great placer mines of Las Medulas, which I am about to visit, so that the entire topography of the country was altered by these gold miners of the Augustan era.

The French law of dividing estates equally between all the children of the deceased owner obtains in Spain, and the consequence is much sub-division of land. Some of the peasants own several small patches, often many miles apart, and necessitating much traveling about in order to keep their grounds in cultivation. The custom of living in pueblos instead of detached farmhouses also occasions much loss of time in going and returning from work. During the day the people spread themselves in every direction for miles around a pueblo. In the evening they all return to the one focal point. As nearly as I could make it out, the terreno or ownership of land in this vicinity was worth from 8l. to 10l. an acre for grain lands, and from 12l. to 20l. an acre for grape lands, including the vines. Near Leon the poorest lands fit for wheat were worth about 12l. an acre. The land measure is the quartillo. Four of these make a celemin, 12 celemin one fanega, three fanegas one hectare, or (say) two and a half acres; so that there are about 60 quartillos to the acre.

To make this land pay, worked as it is with the rudest implements, demands the unremitting toil of both men and women. At Priaranza, on the Duerna, the wages of farm labourers were 7½d. to 10d. a day, women 4d. to 5d. and maintenance; the latter costs 5d. a day. Men who find their own maintenance charge 1s. 8d. a day. They work from sunrise to sunset, except two hours for meals and a siesta in the fields. The age at which field work is begun is from 12 to 14 for boys, and 13 to 15 for girls. Most of the latter become mothers before they attain the age of 16 or 17. At 20 they look old and worn out; at 25 to 30 they become repulsive. The land taxes are very heavy, and form the chief source of discontent with the Government. A peasant at Las Medulas informed me that on one acre he paid 16s. a year, besides 1s. 3d. for sedula de vicinidat, and 5d. for each child over 14 years of age (and, therefore, presumably able to till the fields.) Altogether he paid 16s. land tax and 4s. for sedulas—a good deal of money for the owner of but one acre of land, or for a man whose labour throughout an entire year was only worth about 12l. Besides this he had of course to pay customs and other indirect taxes on the prices of everything he consumed except articles of indigenous growth. The principal articles of foreign origin consumed by this class are hats, sashes, gewgaws, hardware, cotton goods, sugar, and spices. In my next I shall describe the Rio Sil Mines. I expect to finish it next week on my return from a mining trip in Arizona, and will then forward it.

ALEX. DEL MAR.

San Francisco, Sept. 18.

#### THE JABLOCHKOFF ELECTRIC LIGHT AND POWER COMPANY.

SIR,—The simplicity of the Jablochkoff candle has long been looked upon as the great recommendation of the Jablochkoff system, but the shareholders in the company may congratulate themselves that the directors have found something still more simple—the body of shareholders who subscribed for shares. At the meeting last week the Chairman explained that the lighting of the Thames Embankment has been proceeding since the company, on its formation, 15 months' since, took over the contract; but, unfortunately, the contract had been made on terms which had involved a loss. It was supposed that the working expenses would be at least met, but that had not proved to be the case. The lighting, however, was a good advertisement for their business, and the annual loss had been reduced from 7000l. to about 5000l. The new engine-house on the Embankment, the erection of which had been sanctioned by the Board of Works, was now to be taken down. Although they had no legal remedy against the Board of Works, they thought there was great moral obligation on that body to recoup the company the expenditure they had incurred there. Soon after the formation of the company, finding that the time for establishing subsidiary companies had passed for the moment, they turned their attention to manufacturing purposes, and to supplying installations in various places. The purchase of their patents had not been merely for the Metropolitan, or even for England, but for the whole of the British Isles and the Colonies, excepting India, and, consequently, there was a large field for their enterprise. For some time after the formation of the company they were obliged to purchase all their candles in Paris, but they soon obtained machinery from Paris and the services of Frenchmen who had been accustomed to the business. The manufacture of the candles had since gone on at their works on the Albert Embankment, and they were making them far cheaper and better than they were ever supplied by the French company. With regard to the financial position of the company, it was set out clearly in the balance-sheet. The profit was stated to have been 3300l., but, in their opinion, it should have been shown to have been 9000l. more. That amount, however, had been carried to the stock of tools, &c.—he supposed for depreciation. They had done about 70000l. of work, on which they had made a profit of 1244l. They wanted money badly, and they had decided to issue 20,000l. of debentures bearing 7 per cent. He might add that four of the eight directors had arranged to retire, in order that four shareholders might be appointed to their positions, and the directors had also decided that the qualification of every member of the board should be increased from 25 shares, the number originally fixed, to 200. They also intended for the future to take no remuneration till the company was in a prosperous condition. The administration charges would be also reduced. The action of the directors in taking 28000l. for fees was criticised by several speakers, some of whom argued that the company was in a bankrupt state, and that the right course to take was to wind up. This view, however, was strongly opposed by other speakers, who maintained that the company was solvent, and that the preliminary difficulties having been now surmounted it would be suicidal to wind up.

Now, for cool effrontery these proceedings surpass anything I have met with in connection with public companies and their management. Had such proceedings occurred in relation to a mining concern we should have had long diatribes about the speculative character of mining, and the sharp practice of those connected with it; yet I defy any reader of the *Mining Journal* to find an instance among mining enterprises in which such utter disregard for the shareholders has been shown. Here is a company which has been in existence but 15 months, and made a profit of but 3300l., compelled to pay the directors 28000l. fees, and the directors, who have taken that 28000l. for themselves, now propose that whereas a qualification of 200 shares distributed among the eight gave a claim to the 28000l., no shareholder shall join the board to attempt to remedy the ruin which the present directors have left the company unless each incoming director hold as many shares as has heretofore been necessary for the entire board. And not only so, but the directors who have taken the 28000l. have arranged that any directors who now come upon the board shall work gratuitously. But it occurs to me that this preposterous suggestion is simply made to divert attention of shareholders from a matter the investigation of which is much more likely to lead to an enforced disgorgement of something for the shareholders. The Chairman declares that the Thames Embankment contract was one that involved a loss, that loss being 7000l. per annum when the company took the contract over, and 8000l. per annum now. Under such circumstances it is not possible for any court of law or equity in this country to compel the directors to prove that they were unaware that they were buying bankruptcy for the shareholders, and to compel them also to justify their statements upon which the capital was obtained from the shareholders. It will be said that all electricians and scientists have well known for the last ten years that electricity was from its very nature utterly inapplicable to street lighting; but, as the public did not know this, an injunction to stop



be at once obtained to prevent the issue of debentures until the directors have proved to the satisfaction of the Court that they were as ignorant of everything connected with electric lighting as they now pretend to be.—*Glasgow, Oct. 8.* J. A. B.

#### SAFETY-CAGES.

SIR.—There can be no doubt but that this important subject demands the serious consideration and careful study of all who take an interest in the well-being and safety of our mining population, and every encouragement should be given to those who use their humble endeavours to solve the problem of how to lower men into and raise them out of our mines without incurring such terrible risks as recent occurrences indicate. Acting in this spirit the judges at the recent exhibition of the Mining Institute of Cornwall have awarded medals to those who exhibited appliances which in their judgment seemed to be a solution of the problem, or were likely to lead thereto. In this respect they bear favourable comparison with the judges elsewhere, who were content to almost totally ignore this class of exhibits, and thus to wrap the traditional "wet blanket" around exhibits and exhibitors, and together bury them in oblivion.

However Liberal, or even Radical, Cornishmen may be in politics, they are intensely Conservative in all that concerns mining. In this respect their motto seems to be "As it was in the beginning, is now, and ever shall be." Instead of giving encouragement and extending a helping hand to those who would introduce new or improved appliances, hitherto they have been met by open opposition or cold neglect, or by the puerile criticism of irresponsible persons who take it upon themselves to speak dogmatically upon subjects of which they can have no knowledge whatever. I am led to this last remark by some observations in the letter published in last week's *Journal* from your facetious Perranporth correspondent, Mr. W. Ninness, who remarks that "Mr. Secombe's invention might do for downright shafts, but was not applicable for the majority of shafts of the county," a remark requiring no great amount of prescience, seeing that Mr. Secombe had himself stated on the placard accompanying his model that "this cage is specially constructed for perpendicular shafts," and the further petulant remark that "not one of the catches exhibited could be made applicable to general use in the county," an assertion which in the face of offers of guarantee by the exhibitor to the contrary is, to say the least, uncalled for. Mr. Ninness might at least have ascertained the value of such guarantee before making such a sweeping assertion.

There are some people who object to every invention or improvement on principle. There may be others who earn a precarious living by sitting on coroners' juries; these would, of course, object to safety cages. It should be borne in mind that few inventions immediately reach perfection. The steam-engine of to-day is but the perfected invention of Trevithick, who, doubtless, heard his invention cynically denounced as being inapplicable by self-appointed critics.

It is notorious that many of the mine shafts of Cornwall are of the most wretched description; indeed some of them are so bad that a continuance of the ancient kibble for raising the stuff is imperative. In others where the skip is introduced it is of necessity of the most ridiculously diminutive proportions. As well might we ask for the invention of a gun specially constructed to shoot around corners, or for a barrow specially made to wheel through the intricate levels of Pedn-an-drea, as to ask inventors to waste their time in specially constructing cages for such shafts. Obviously the proper thing to do would be to remedy the defective shafts; and if Mr. Ninness will apply his unquestioned powers to remedying this evil he may yet become a benefactor to his country and his kind, and, no doubt, a future generation will erect a beautiful clay monument on the sands at Perranporth to his beloved memory. A. Z.

*Gunnislake, Oct. 10.*

#### SAFETY CATCHES FOR CORNISH MINES.

SIR,—I quite agree with the object of "T. G. M.'s" communication in the *Mining Journal* of Oct. 6, of asking "R. M." to give the readers of the *Journal* his ideas in a practical form as to how a gig after the rope has broken shall send its way to the bottom of the shaft in a decent manner. Paddy, after he had fallen off a scaffold to the ground, was asked by a friend how he liked falling. "Be da, he answered, 'it isn't the falling—it's the landing—it's the sudden stop when ye git to the bottom that does it.' And so I think "R. M." will find with regard to the gigs. Notwithstanding, his plan may be feasible; anyhow, it will be acceptable to readers of the *Journal*. I may be fastidious; but I for one cannot see braking myself down a shaft in a gig in case of the rope breaking. Such would be a case of putting the brake on going down the hill with a vengeance. For the life of me I cannot see the least bit of fun in it; and I shall indeed be pleased to learn, through the columns of the *Journal*, that instead of the cage reformers having persistently got hold of the wrong end of the stick, that "R. M." has not, and, moreover, has not burnt his fingers in trying to prove they have. This is not a subject to be trifled with, and it is all important that one and all should set their brains to work to produce a suitable appliance, as I say again fearlessly that nothing as yet has been brought forward that could be made applicable to general use in the county. If the suggestion of Mr. Bennetts in the *Journal* of Oct. 6 to the Mining Institute and Polytechnic Society is carried out, it may produce beneficial effects, and give general satisfaction; and in common justice to Mr. Bennetts I think it most certainly ought to be, unless the judges claim infallibility, which only themselves will support. W. NINNESS.

*Perranporth, Oct. 8.*

#### THE TRADES UNION CONGRESS—INCREASED INSPECTION.

SIR,—Upon going through the subjects discussed at the recent Congress I was led to ask myself the question—What on earth do miners want? More Government Inspectors. There is really no necessity for more. I would urge upon the miners to notice one of Aesop's fables, with a splendid moral for them. The frogs once upon a time were dissatisfied with their state (no wonder miners are), and, in fact, like the miners, did not know what they wanted. They preyed to Jove to send them a separate king; Jove answered their petition by sending a stork; the miners knew the result. Your correspondent "J. R." in his communication in the *Mining Journal* of Sept. 22, adduces arguments. Trade Unionists might do worse than ponder. No increase, however great, in the number of Government Inspectors can prevent accidents and explosions, the result of gross carelessness, and in numerous cases wilfulness on the part of the miner, which is the cause of the majority of these sad occurrences in our collieries.

It cannot be gainsaid but that Inspectors have been the means of preventing both explosions and accidents; but no Inspector in existence can be responsible for the actions of a miner wilfully carrying a naked light into workings he was cognisant contained gas, or likely to do so, or accidents through a miner working underground known to be unsafe. In reference to the latter, "J. R." truthfully asserts—"Nothing, however, was said at the Congress with respect to the most fertile source of death and danger in our mines." Now, had the Congress passed resolutions or laid down a code of laws to be enforced relative to miners protecting their own lives, instead of praying for more Inspectors, and things equally as absurd, they would have benefited their community. When miners demand an increase of wages because they are compelled to use safety-lamps, or in other phraseology protect their lives against their own inclinations, such unreasonableness detracts from their wisdom. Were miners left to themselves—that is, to make their own laws and work as they like—there is abundance of evidence to prove that, like the famous Kilkeny cats, they would soon annihilate themselves. Happily they are in better hands.

I consider the unkindest cut of all they gave to themselves at the Congress was in the passing of the resolution that a Bill should be promoted to regulate the hours of all workmen in the employ of the State, or by a public body or company requiring Acts or concessions by Parliament, and that eight hours be the daily maximum. Are the miners really aware of the amount of injury they are doing themselves? I cannot think they are, and yet it is visible in the times to the dullest intellect; they are simply playing in the hands of the

foreigner. Miners on the Continent are working longer hours and for much less pay than we are; living, too, is much cheaper there. Then, I ask, how are we to possibly keep pace or compete with them if we are to keep on decreasing the number of hours we work, and continue this infernal system of one-sided Free Trade. W. NINNESS.

*Perranporth, Oct. 9.*

#### THE HAMOAZE TUNNEL AND EMBANKMENT SCHEME.

SIR.—The substitution of a tunnel having a gradient less than that now existing on each side of the river for the expensively maintained and wretchedly inconvenient Ferry Bridge now in use, is an improvement which must be accepted with great satisfaction by all parties on each side of the Tamar. With the dockyards in Devon, and some of the large fortifications in Cornwall, the principal access to which is by the Ferry Bridge, the Government will possess a means of transit which will to them be most advantageous, and the benefits of which under possible contingencies will be incalculable. To the inhabitants of the three towns, as well as Torpoint and the important villages near it, the obtaining a carriage and footway open by day and night at all hours, at no increased charge from that now made, the convenience will be great and the pecuniary advantages many. The landowners on the Cornwall side will be the greatest gainers by the scheme; and, seeing that for market gardens and also for building sites, and other considerations, their properties must be greatly enhanced in value presently, we can scarcely believe that they will fail to give their hearty and substantial support to the undertaking.

The most casual observer knows that there are no engineering difficulties, and there are many mine captains in Cornwall who have to confront obstacles much greater than any here presented, and Cornish miners, with the aid of the boring machine and dynamite, would make short work of boring through this piece of rock. Some of the Cornish mines have tunnels which, compared to this in length, may be multiplied by hundreds. It is true their dimensions are far less than those required here; but it is equally true that, on account of its extra size, the blasting operations will be done at from 25 to 30 per cent. per cubic yard less than the mining tunnels are driven. The cost of the maintenance of the tunnel will be about one-third of that now required for the Ferry Bridge, and the increase of traffic will, probably, soon be increased by 100 or even 200 per cent. Indeed, it is impossible to estimate what may, within a few years, be the result.

With land for building purposes possessing a panoramic view of mountain and valley unsurpassed, and soil for laying out the loveliest gardens imaginable, and in near proximity to the beautiful Whitsand Bay, the villages on its shores, probably, soon becoming fashionable watering places, within an easy distance of the Three Towns, and from which the drive over the proposed new road will be a magnificent one, the scheme presents facilities which cannot be overlooked or overrated. By means at hand the tunnel will be cheaply lighted, ventilated, and drained, and thus to passengers be made comfortable if not pleasurable. It is suggested that a tramway should be constructed through the tunnel from Devonport to Saltash, if not to Millbrook. The trams may be propelled by steam or electricity. *Devonshire Chambers, Oct. 10.* THOS. VOSPER.

#### INSTITUTIONS FOR THE IMPROVEMENT AND STUDY OF MINING IN THE UNITED KINGDOM.

SIR,—In reply to the Notice to Correspondents in last week's *Journal* I may mention that the Mining Institute of Cornwall, and the Miners' Association of Cornwall and Devon, are two societies whose aims are to encourage the study of mining and matters bearing on it. Mr. C. Twite, F.G.S., of St. Agnes, and Dr. Hudson, of Redruth, are honorary secretaries, and I am assistant secretary of the Miners' Association, whose work consists mainly in helping young men to study the various sciences bearing on mining. This it does by rewards of books to the students, in addition to the award from the South Kensington department; by selling apparatus and chemicals to the teachers at cost prices; by keeping a trained scientific lecturer to give instruction to the students; and offering advice and assistance to the teachers, and generally by encouraging scientific teaching, more particularly in regard to mining.

The Mining Institute, of which I am the secretary, is a society the object of which is to enable mine agents and others interested in mining to exchange their views by means of papers read and discussed at its periodical meetings, and generally to watch the mining interests of the county, and take what steps they may consider necessary to its welfare. The Institute holds an annual exhibition of mining machinery, tools, &c.—*Redruth, Oct. 9.* WILLIAM RICH, Jun.

#### MINING PROSPECTS—IMPORTANT DISCOVERIES.

SIR,—So few discoveries of importance have been made of late in any of the Cornish mines that the announcement of a "great improvement" in St. Just United Mines comes very pleasantly. It is to be hoped that it is but one of the many "great improvements" mine adventurers have so long been looking for. A stope in back of the 140 is reported worth 100*l.* per fathom. At the meeting held last week it was stated that the deepest part of the mine yet seen is very rich. Eleven fathoms below the 140 the lode is valued at 120*l.* per fathom for the length of the sink (12 ft.), and in commencing to drive the 150 fm. level the lode in each end east and west is worth 50*l.* per fathom.

Such a lode has already begun to tell its own tale; 41 tons of tin were sold in September, the produce of the previous six weeks. The meeting having been held before the usual time only 12 weeks' tin was sold, and if only 12 weeks' costs had been charged the profit would have exceeded 1000*l.*, but as 16 weeks' costs were charged the profit shown was about 100*l.*

The opening of the Great North Downs lode in Wheal Pevor sett may also be designated an important discovery. At a depth of only 30 fathoms from surface the lode was struck, and is worth for tin and copper 10*l.* per fathom; the lode is 7 ft. wide, and in a very short time it will be seen 60 and 100 fms. deep by cross-cuts driving towards it from Wheal Pevor levels.—*Oct. 8.* HOPE.

#### ABERLLYN MINE.

SIR,—I would feel much obliged for a little space in the *Journal* to call the attention of those interested in the Gwydyr Amalgamated to the fact that they are committing a very serious error in allowing this mine to go out of their hands for what the machinery may now fetch, if that is what they are going to do. I will venture to affirm that in all this principality no living man can find a better prospect, if so good, at such early stage of development. Here is a lode from 20 to 30 ft. wide, producing in the stope in the No. 2 adit 5 tons of blende to the fathom. This is not a mere guess, but was actually realised by the last working. Three men in 15 days raised and trammed to the dressing-floors 11 tons of blende, which at 3*l.* per ton would be 33*l.*, and we have realised 3*l.* 18s. 6d. per ton, and according to the present tone of the spelter market there is every probability that the prices will go up to that again.

But if we make a calculation on the basis of 3*l.* per ton, according to the above results, 10 men in four weeks would raise 56 tons, which would be 168*l.* Then for wages and materials (say) 45*l.*, and dressing, &c., at 1*l.* per ton, would make a total cost of 101*l.*, leaving 67*l.* for royalties, establishment expenses, &c., which would far more than cover them, for it must be remembered that there is no steam required, no pumping, no winding, but the stuff is trammed direct to the dressing-floors. And I will venture to affirm that for dispatch and effectiveness there is no machinery in the country that will excel them. The total cost of treating the stuff as it comes out of the mine does not exceed 1s. 6d. per ton. Then the chances of getting lead cannot be surpassed, for it scarcely ever occurs that such bodies of blende are found except in association with lead, and a more favourable situation than between the present workings and the Park Lake for the discovery cannot be found. Here the rock or formation is quite undisturbed, and the lode as far as can be seen unbroken by any adverse measures.

It may be said that the late working was a failure, which may be true in a certain sense, but in the true sense it was not. That such

results as were anticipated have not been realised I readily admit, but that was not altogether the fault of the mine, and, indeed, I may say but very little was owing to the productiveness of the lode. The prices militated against us, because a great deal of the blende was sold for less than 40s. per ton, and in the meantime a great deal of work was done in opening the mine. The No. 2 adit was driven a long distance on one side of the lode, and a rise was put up a great distance to communicate with the shaft from surface from which no returns were made, as the lode was not cut through, and so the capital went in improving the property by opening it out in a miner-like manner, the benefit of which will certainly be reaped some day by someone. The mine, therefore, is in a far better position now than it was a year before operations were suspended, because in a little time the shaft would have been communicated, and a large piece of the lode laid open for working. In my experience of 30 years constant application to this business I never saw a more kindly lode than this is in, and near the shaft, and I do not think that any miner of the same amount of experience would attempt to gainsay or contradict it.

In the face of these facts I cannot understand how gentlemen can be so much opposed to their own personal interest as to be so careless and unconcerned in this important matter. It may be assumed that I am writing from personal interest. Well, that is so, for I have a great number of shares; yet still I would urge strongly upon the old shareholders to reconsider the matter, and not let others come in and reap the benefit of their money.

The thing I would suggest is to form a syndicate of (say) a half dozen to purchase the concern as it stands from the liquidator, and either work it right off or keep it till there will be better times, for those times must come. JOHN ROBERTS, M.E.

*Llanrhaeadr, Oct. 4.*

#### MANGANESE, AND ITS COMMERCIAL VALUE.

SIR,—I wrote some time since asking about the value of black oxide of manganese. Since then a firm here have sent home a shipment, and have made a statement to the effect that the account sales show a return of 4*l.* 16s. per ton, which, they say, gives a profit of 2*l.* per ton. I have in my hands a fine property, only two miles from a shipping port, on which there is a large lode of splendid manganese, assaying about 75 per cent. Will some correspondent state through the *Journal* what market there is for it in England, and whether any persons in England would purchase such a property to work for the ore. Mining generally has been at a very low ebb here, though the Moonta and Wallaroo Mine proprietors are making a fresh move to push ahead. One or two of our gold mines are becoming well established, and bid fair to prove profitable. We are suffering from terribly depressed times, owing to a succession of bad harvests; but our prospects for the coming crop are splendid, and it is not unlikely we may have 3,000,000*l.* worth of wheat in December and January next.—*Adelaide, Aug. 25.* J. B. A.

#### BEREHAVEN MINING COMPANY.

SIR,—Lately there has been very little to report as to mining in Ireland, but it is very satisfactory to be able to announce that a great improvement has occurred at the new workings in the celebrated Berehaven district. At the Berehaven Company's Copper Mine, at Coom, it is stated that the present end in the 50 fm. level driving east will produce 2½ tons of ore per cubic fathom. The Berehaven ore is from 10 to 12 per cent. produce, and from present appearance it is considered that the lode is becoming richer, and the copper-bearing part wider. There are two stopes working in the back of the 40, six men in each, set at 5*l.* per fathom, and yielding about 2½ tons of ore per fathom. G. T. P.

#### EAST BOTALLACK.

SIR,—Our attention having been called to the announcement which appeared in last week's *Mining Journal* that this mine would (with others) be struck off the List unless cause was shown to the contrary, we immediately communicated with the Registrar of the Stannaries Court, who has kindly informed us that it referred to a limited company started many years ago under the title of East Botallack Tin Mining Company (Limited), which we believe commenced to work a property not far from us, but which soon came to grief. It is somewhat unfortunate for us that the full title of the company about to be struck off was not given, as an announcement like the above is capable of injuring us; permit us, therefore, to inform our shareholders and your readers that East Botallack Mine is divided into 6000 shares with 19s. per share paid. Our sett comprises a portion of the famous old Ballewidden Mine, has nearly a mile run on the lodes, and about 300 acres in extent—sufficient to make two large mines. The mine is a favourite in the district of St. Just, and we court every enquiry. We are now concentrating all our forces on a good lode discovered some months ago, which underlays into the Ballewidden Mine, but which we have the power to follow. The quality of this lode has varied from 50 to 120 lbs. per ton of stuff. We have sunk from the adit to the 10 fm. level, where tributaries have now gone to work. We commenced to sink the shaft to the 20 this week, and having already made small sales of tin at this shallow depth, we have reasonable hopes for an important future. *Oct. 10.* JOHN HOLLOW, Purser.

#### LEAD MINING INDUSTRY.

SIR,—The exceedingly low price of lead which is crippling our lead mines, and restraining many from paying dividends, is a subject which is now forcing itself in an unpleasant manner on the attention of those interested in the production of this particular mineral, and unless there is a reaction or something speedily accomplished to alleviate the severe losses at present sustained by lead mines, not for want of mineral, but the small value of it, many mines must collapse.

Amongst the several reasons recently enumerated by correspondents in the *Mining Journal* as to the present heavy depression in the English lead market, that the foreign supply far exceeds consumption is the main cause is doubtless correct; of course, there are other minor reasons. At the present moment the only remedy to give the English producer fair play is for them to adopt your correspondent "F. H. C.'s" suggestion in last week's *Mining Journal*—petition Parliament to revise the present low tariff imposed on foreign lead imported into this country, or a deputation of our principal lead producers to wait on the Home Secretary, and state to him the gross injustice of the present tariff on foreign production to English producers.—*Perranporth, Oct. 8.* W. NINNESS.

MECHANICAL PROGRESS IN COVENTRY.—The high reputation Coventry has acquired in connection with the manufacture of some of the more delicate kinds of machinery—bicycles and tricycles—has become almost proverbial, and the series of illustrated catalogues just issued by Messrs. Hill and Morton, Britannia Works, Coventry, go far to show that this reputation is not undeserved. Among the latest novelties introduced by the firm is the Arion tricycle, which they explain is fitted with an improved double-driving apparatus, acknowledged by eminent judges to be the most perfect double-driver yet introduced. It has been designed with the greatest care, and there is not a single part in its mechanism which has not received most careful forethought, and is so skilfully and accurately fitted as to combine freedom in propulsion with great stability, while the rider's general comfort in every way has received the utmost consideration. Both the Cycle and the Perambulator catalogues are worth consulting before deciding what choice to make. Messrs. Hill and Morton have also a price list of patent hammerless breech-loading and other guns, revolvers, and pistols; in this they illustrate the leading guns in the field both at home and abroad. Some of the designs are unusually attractive, whilst the prices have so wide a range that it can scarcely be supposed that any purchaser will find difficulty in suiting his taste and means. In this connection reference may also be made to the illustrated price-list of high-class watches, clocks, and jewellery manufactured by the Chronograph Watch and Jewellery Company, of Hill Cross, Coventry. It would, of course,



be impracticable to refer to all the various pieces of mechanism and jewellery illustrated in this catalogue, but one or two of the leading articles may be mentioned. The company's speciality appears to be their patent chronograph centre seconds stop-watch, which is claimed to be the most complete watch ever offered to the public, for by the use of machinery in its construction the mechanism is most accurate. It is the most precise time measurer yet invented, and is invaluable to sportsmen and scientists for marking the exact time occupied in rapid performances, or testing the speed of machinery. The seconds in this watch works in front, and denotes time to the fifth part of a second. By merely pressing the hinge at the top, the centre seconds is immediately stopped or started as desired. Of the jewellery and clock designs generally it may be said that they are in good taste and great variety.

#### REPORT FROM CORNWALL:

Oct. 11.—A very good proof was afforded of the dulness of the times (though certainly none was needed), even before the smelters announced their last drop, in the attempted sale of the first batch of the mine shares of the absent Mr. Boyns. No bids were made for Pedn-an-drens, though they were sold subsequently by private contract, North Buys, Herodsfoots, or East Unys, though there was an offer of 10s. for the latter by letter. The result, therefore, was, that while the shares offered had a call liability of 1971½, those sold realised only 187½. The result of throwing all this property into the market, and especially under such conditions, has been considerably to lower the current quotations. This was both inevitable and unfortunate, and though it may fairly be assumed that some of the purchases will be found fairly remunerative, the influence of Mr. Boyns' failure is not likely speedily to pass away. The only element of satisfaction that can be gathered from this unfortunate business is that in all probability we do not know the worst of it.

There seems to have been a curious misapprehension in some directions of the allusion in last week's report to the refusal of Mr. Bennetts to accept the bronze medal awarded to him at the exhibition of the Mining Institute in company with several other exhibitors. No ambiguity was suspected in the paragraph, which was simply intended to mean that such an award had been made to him in company with the other exhibitors named, and not to imply—which is not the case—that any of them united with him in its refusal. Probably they may feel that the Council of the Institute have given proof alike of their desire to encourage invention and to provide the mines with the apparatus best suited to their needs. So far that is believed to be Capt. Bishop's. But the point is a very difficult one; as Mr. Warington Smyth showed the other day, similar appliances have been abandoned largely in the coal districts, because with the high speed of drawing they really introduced new dangers. This is one point that has to be guarded against; and another is the absolute necessity of adopting the appliance which is not only most effective but least likely to get out of order. That this latter point was very prominent in the minds of the judges at the Polytechnic is proved by the suggestions made for improving the devices shown, and it is clear it was equally present to the Council of the Institute. Perhaps it is hardly worth while adding that Captain Bishop did not act as a member of that body while the safety catches were under discussion; and yet in justice both to him and them the fact may as well be stated.

The result of the trials of the pulverisers has been made known, though the full details have yet to appear, and Capt. Nicholas will have the silver medal and Messrs. Dingey the bronze.

Capt. Nicholas, with a consumption of 2 cwt. 3 qrs. 23 lbs. of coal, in eight hours pulverised 2 tons 17 cwt. of stuff, being 21·06 tons pulverised and 4 cwt. 1 qr. 14 lbs. of tin produced per ton of coal.

Messrs. Dingey, with 4 cwt. 3 qrs. 19 lbs. of coal, pulverised 4 tons 15 cwt. of stuff, being 19·31 tons pulverised and 4 cwt. 1 qr. 7 lbs. of tin produced per ton of coal.

Messrs. Toy and Stevens, with 2 cwt. 1 qr. 9 lbs. of coal, pulverised 2 tons 10 cwt. of stuff, being 21·45 tons pulverised and 3 cwt. 3 qrs. 4 lbs. of tin produced per ton of coal.

Mr. A. Pryor, jun., with 1 cwt. 1 qr. 18 lbs. of coal, pulverised 1 ton 5 cwt. 3 qrs. of stuff, being 13·47 tons pulverised, and 2 cwt. 1 qr. 14 lbs. of tin produced per ton of coal.

Capt. W. Teague, jun., with 2 cwt. of coal, pulverised 1 ton 11 cwt. 3 qrs. of stuff, being 15·87 tons pulverised, and 1 cwt. 3 qrs. 26 lbs. of tin produced per ton of coal.

Pretty much the same ratio seems to have been shown at Pedn-andrea as at Falmouth Docks between the apparatus of Capt. Nicholas and of Mr. Pryor, but as that of Messrs. Michell and Tregoning was not exhibited at Redruth this comparison cannot be carried further in that direction. The conditions of the two sets of trials were, however, sufficiently close to enable the very interesting body of facts now collected to be treated as a whole. As had indeed been previously suspected, it is now very clearly shown that quantity of work is one thing and quality another, but that the simpler machines should be the lowest in both was not at all what was anticipated even by many who had given attention to the subject. Probably here the rate of driving has most effect.

#### TRADE IN SOUTH WALES:

Oct. 11.—The shipments of coal during the month of September amounted to 533,707 tons foreign and 88,930 coastwise at Cardiff; Newport, 127,897 tons foreign and 87,354 tons coastwise; Swansea, 87,484 tons foreign and 58,749 tons coastwise; Llanelly, 3585 tons foreign and 10,505 tons coastwise. The shipments for the first nine months of the year were 5,004,990 tons foreign at Cardiff, and 715,007 tons coastwise; Newport, 1,164,717 tons foreign and 740,088 tons coastwise; Swansea, 734,227 tons foreign and 610,721 tons coastwise; Llanelly, 32,700 tons foreign and 85,185 tons coastwise. The amounts sent away last week were:—Cardiff, 150,181 tons foreign and 21,109 tons coastwise; Newport, 37,952 tons foreign and 18,246 tons coastwise; Swansea, 20,537 tons foreign and 7328 tons coastwise. Patent fuel was exported from Swansea during the first nine months of the year to the extent of 265,943 tons, and 117,960 tons from Cardiff. The tone of the market is firm, and prices steady. Good colliery-screened range from 10s. 9d. to 11s. 6d.; double-screened 9d. extra.

The last report from the Rhondda Valley is as follows:—The demand in this district still remains good and regular, although not in all respects fully equal to the elastic needs of all the collieries opening and worked in this valley. Work is plentiful, and the body of men—100 in number—thrown out of employment by the closing of the Aber-Rhondda Colliery, with its famous No. 2 seam, are all at work at other neighbouring collieries. The working of this seam of coal is likely to receive a strong impetus by the transfer of the Llwyncoelyn Colliery to the Lewis Merthyr Coedcae Company. This strong and influential company intends opening the seam extensively. The hauliers' dispute at Cymmer Colliery has been amicably arranged. The summonses on both sides—which otherwise would have been heard on Monday last at the Pentre Police Court—have been withdrawn. The future payment of hauliers and labourers, and for days when any fatal accident may happen, is to be regulated by the custom at the majority of other collieries in the valley. Disputes of all kind in future that may occur with the hauliers will be referred to a workmen's committee. Failing that, the services of a miners' agent in the district are to be called in, and by this method strong hopes are entertained that future stoppages of the collieries will be avoided. In the Deri and Bargoed districts the coal trade continues very brisk, and the men are working very regularly, as there is a good demand for the class of house coal worked in these neighbourhoods. The coke trade still remains steady, and prices have remained unaltered for some time past.

The threatened strike in the steel trade is virtually over, the men having, with few exceptions, accepted the 10 per cent. reduction. If manufacturers by excessive competition, give away this 10 per cent. to the public the trade will soon be in the same depressed condition as it was in the past month. While we can work at lower prices than German and Belgium manufacturers, we are sure to get the bulk of the contracts; but if that is only to be done by lowering wages, and giving profits away to the public, the outlook is not re-

assuring. The amount of iron sent away from Newport in the first nine months of the year was 146,057 tons; Cardiff, 76,233; Swansea, 5598. Last week Newport sent away some large parcels as follows: Alga Bay, 2402 tons; New Orleans, 2080; Montreal, 1376; Warberg, 690. Cardiff sent away one parcel of 748 tons. The iron ore trade is still in a low condition. Newport received 11,043 tons last week from Bilbao, and 5675 from other places; Cardiff, 7905 tons from Bilbao, and 2162 from other places. The price may be quoted at about 13s. per ton.

The Tin-Plate Trade is in a more encouraging condition. The outlook at present is good. Good IC cokes are not parted with under from 16s. 6d. to 17s. per box.

#### REPORT FROM NORTH AND SOUTH STAFFORDSHIRE.

Oct. 11.—The Quarterly Meetings yesterday in Wolverhampton, and to-day in Birmingham, have not resulted in any alteration in crucial prices. All mine pigs have been redeclared at 65s. to 62s. 6d. for hot-blast and 85s. for cold. Native part mine pigs have changed hands at 50s., and common at 40s., down even to 37s. 6d. Hematite prices have favoured buyers. Barrow hematites have been quoted at 61s. to 62s. delivered, and Tredegar at 60s. Lincolnshire pigs remain at 50s., and Derbyshire at 47s. 6d. The demand has been slow for all sorts. Marked bars have been redeclared at 71. 10s., with the customary 12s. 6d. extra for the Round Oak brand. No great number of sales have been made, although the attendance of traders at both gatherings has been large and influential. Common bars have gone off at 61. 7s. 6d. to 61. 2s. 6d. Hoops have moved freely at 61. 10s. for ordinary sorts, and strips have shown considerable life at 61. 5s. for gas and rail qualities. Tank plates were tame at 81. for good qualities, and 81. 10s. to 91. for boiler sorts. Sheets have seen most business, but it is at present impossible to advance rates. Doubles are still 81. 5s. to 81. 10s., and battens 11. additional. Prices for manufacturing coal are without improvement, and consumers can look forward for six months at current easy terms.

As 'Change closed to-day it was announced that the Coal Trade Wages Board will be summoned together at an early date, with the President at their head, to consider the colliers' notice for an advance. The galvanisers held their quarterly meeting, and it was reported that a considerable number of sheet orders had recently been booked, but at low prices owing to excessive competition. Spelter and black sheets being dearer it was determined to fix galvanised sheets of 22 to 24 gauge at 131. 10s., in bundles delivered in London. The Welsh tin-plate makers at their quarterly gathering here reported that the present make was within the consumption. Coke-plates were quoted 16s. 6d. per box, a rise on the quarter of 9d. The wrought-iron tube makers at their quarterly gathering made no alteration in discounts, but adjourned decisions upon other questions for a week.

Some of the miners in South Staffordshire continue to agitate for a 10 per cent. rise in wages, to which they urge they are entitled notwithstanding that there has been no rise in prices. Indeed, although there was a fall in prices in May last, wages were not lowered, so that, whilst coal now is 1s. a ton cheaper than at the beginning of the year, wages remain the same. The demand, therefore, will not be granted without a compensating advance in prices. The miners in the Tipton district are especially urgent in their demands for an advance; and at a meeting this week, at which 12,000 miners were alleged to be represented, it was resolved that the present rate of wages was much too low, and that the time had arrived for an advance. The resolution went on to empower the secretary to ask for a full meeting of the Wages Board, to be convened with a view of obtaining such an advance. In the Cannock Chase district a resolution to the same effect has been passed, and another resolution urging the miners to join together to constitute "a good and powerful union," such being termed "the best means to secure the interest of labour."

It is now 22 weeks since the miners of Silverdale, North Staffordshire, came out on strike against the 10 per cent. reduction in wages, and they are still continuing the struggle. Many of the men are in the Lancashire and Cheshire Federation. No less than 28,000l. has already been distributed in relief.

#### REPORT FROM DERBYSHIRE AND YORKSHIRE.

Oct. 11.—The wages question has led to several meetings being held in many of the Derbyshire mining districts, where the usual resolutions were passed in favour of an advance. The colliery owners are taking little or no notice of the movement, for nothing appears more unlikely at the present time than anything approaching a strike. The men naturally enough vote for an advance of wages; but they are not likely to go farther than that, seeing that they are now being well employed, and in receipt of fair wages. So long as this is the case, and seeing that comparatively few of the miners belong to the Association, a strike is about the last thing that is likely to take place. The coal trade generally has been good, and a larger tonnage than usual has of late been sent to the Metropolitan from the leading collieries, including Clay Cross, Eckington, Grassmoor, and Langley Mill. Most of the coal is sent for household purposes; but there are a few contracts for steam sorts for several works in the Metropolitan. Gas coal has gone off much better of late, a large tonnage passing over the Midland to the South and West. The Great Northern Railway Company is now taking a large tonnage of coal from several collieries on the line between Derby and Nottingham, and is evidently transferring its favours as far as it can from the West Riding to Derbyshire and Nottinghamshire; at least, so far as the London traffic is concerned. At one time, the Great Northern took most of its coal traffic to London from South Yorkshire when the company was the largest dealers in coal in the Metropolitan, purchasing at the pits, and selling to the merchants and dealers. Now, however, it is different, and Yorkshire has been partly thrown overboard in favour of districts nearer to the Metropolitan. The iron trade keeps up very well, there being a full average output of pig at the various works, and what with the quantity sent into other districts, and the local consumption at the foundries in particular, not much has to go into stock. The rolling mills that have been quiet for a considerable time are now becoming more active, and it is said that a very large contract has just been entered into for girders, a description of work for which the works until recently under the management of Sir J. Alayne, Bart., have had the highest reputation, the vast girders at St. Pancras Station having been turned out at them.

Some branches of the Sheffield trades that have had a rather quiet time of it for some months past are now looking better, orders having come to hand rather freely for delivery towards the end of the year, and these include fancy material for dressing-cases, small tools, and similar goods suitable for presents. The cutlery houses are rather better employed, even in inferior qualities of pocket-knives for the home markets, whilst in the finer descriptions of table-knives an improvement has also to be noted, although the high and advancing price of ivory and other fine hatching has been a drawback. There has not been any change as regards the production of steel, Bessemer or crucible. Of the former not much is now required for rails, for the old makers do not seek orders for them, seeing that the price has got down as low as 41. 12s. 6d. per ton; but they continue to receive fair orders for other descriptions of railway material, for which the competition is not so great, so that they are turning out fair quantities of points, fish-plates, springs, tyres, axles, and ordinary wagon wheels. The latter branch has now assumed large proportions in the town, there being several special makes, such as Hadfield's, that are well known in all parts, at home and abroad. In crucible steel, indeed, business seems to be increasing—so much is required for castings that were formerly produced of iron. A good deal of steel is also being absorbed in the making of the new armoured plates. These latter are particularly active just now at both Brown and Cammell's, who hold heavy contracts from our own and other Governments, which will keep them busy for a very long time. In ordinary rolled iron a fair amount of business is being done, more especially in sheets and ship and boiler plates. The foundries, both in the town and outside, are now working well in both light and heavy castings.

#### TRADE OF THE TYNE AND WEAR.

Oct. 11.—The Coal and other Trades here are, on the whole good, and the prospect for the winter is encouraging. The demand for best steam coal is fair, and the price is well maintained at about 10s. per ton. All the works will be kept going regularly unless the movements of vessels are retarded by the weather. The shipments of coal from north-east ports in September, as compared with the same month last year, show a considerable increase, amounting to 55,000 tons. It is noticed that the steam coals from this district are gradually getting into favour again at some points where they have been ousted of late by coals from other districts. In Durham the gas and coking coalworks are about fully employed, and there is a good demand for the now-famed screened nut coals, and also for most kinds of coals consumed in the local manufactures and at distant markets. There is also an excellent demand for bunker coal for steamers, and for small coals of all kinds. The demand for best house coals increases as the winter approaches, and should the season prove to be severe, it appears probable that there will be a considerable improvement in value—indeed, advances have already been made in this coal both in the home and coast markets, and they have been advanced considerably in the London market.

The increased value of the best Wallsend produced in this district will naturally draw attention to the famous High Main seam on the Tyne, the original Wallsend coal. This seam has been won lately at the Shire Moor Colliery, about four miles north of the Tyne, the fine quality of this seam and its great thickness renders it very valuable. The normal thickness of the seam is about 6 ft.; but it has been found in some localities up to 9 ft., and as much as 11 ft. in some districts. At Shire Moor it is, we believe, not far short of 11 ft. in thickness. There is a large tract of this coal in the Tyne which has been flooded many years, and a considerable amount of this coal is held by the Tyne Coal Company; but the pressure of the water has prevented the working of it. The company have worked a pumping-engine at Wallsend for some time, and this engine keeps the water down to a certain point; but in order to drain the water from the seam, it will be necessary to establish another engine at some point further east or north-east from the station at Wallsend, and this engine will probably be placed somewhere in the old Wellington Colliery coal field. The task of removing this water is no doubt a difficult one; but there is no doubt that the result would ultimately prove highly beneficial to this enterprising coal company. The Tyne Coal Company are at present working the old Hebburn Colliery on an extensive scale, having sunk the shaft to the Low Main, or Hutton, seam, which was found entire, and it is now shipped very largely, mostly for gas purposes. Formerly the High Main and Bensham seams were extensively worked here, and they produced first-class house coals. The Hebburn Colliery is one of the oldest coal works on the Tyne; it has been worked upwards of 100 years, and it was at one time under the management of the famous Mr. Buddle, of Wallsend.

In the Iron Trade a large volume of business continues to be done both in pig-iron and also in finished iron, particularly in ship-plates, angles, bars, &c. In the nine months of the year that have passed the production has been fully maintained, but though the whole of the pig-iron made has been sold prices have weakened. Less manufactured iron has also been sold; the prices have fallen, and wages also must now be reduced, in spite of the combined efforts of masters and men to keep the prices up by means of restricted make. This is the most unpleasant feature in the iron trade; a large business is done, and stocks are being reduced, yet prices continue to droop. At the commencement of this year the price of Cleveland iron was 43s., but it is now only 39s.; ship-plates were 61. 10s., and are now 61. 5s.; and there has been more than an equivalent reduction in the value of steel rails. These prices are certainly not satisfactory, and any further fall would lead to serious consequences. The one hopeful feature in the trade is the continued reduction in stocks. It is therefore hoped that any marked increase in the demand will lead to improved prices.

The ironmasters' returns for September were issued at Middlesbrough last week, and they show that at the end of September 118 furnaces were in blast, 83 being in Cleveland iron and 35 on hematite. All the four furnaces at the Middleton Ironworks, Darlington, are now out of blast. During the month the make of Cleveland pig-iron was 148,081 tons, as compared with 156,523 tons in August, a decrease of 8442 tons; and 75,033 tons of hematite, spiegel, and basic iron were made, or 2075 tons less than in August. The total make of all kinds of iron for September was 223,114 tons, against 233,631 tons in August, decrease 10,517 tons. It must be noticed that there is one day less in September than in August. Makers' stocks of Cleveland pig-iron decreased during September by 4892 tons, the quantity held over the whole district being 175,235 tons, making with the iron held in public stores a total of 261,900 tons, showing a satisfactory decrease in stocks for the month as compared with August of 13,298 tons. The shipments were 94,367 tons, a satisfactory increase of 5882 tons in August exportation. The iron shipbuilding trade continues brisk, and most of the engineers, ironfounders, &c., in the district are also well employed. It must be noticed that the building of steel steamers is steadily progressing. The West Cumberland Iron and Steel Company is now producing large quantities of steel plates. A ship built at Workington of this material has just been launched. The great makers of iron plates in this district, at Jarrow, Consett, &c., will be compelled to turn their attention to the manufacture of steelplates at no distant date. The Consett Iron Company have indeed already commenced the manufacture of steel, and the new steelworks of Sir William Armstrong and Company, at Elswick, will also be in operation before the end of next year. At Jarrow and other works on the Tees this manufacture will also have to be adopted.

The Hove Ironworks, Jarrow, have been idle some time; they have, however, been let to a number of Midland gentlemen, who are now putting down machinery for the purpose of manufacturing their plates. The situation is excellent for this purpose, and there is a great demand for these plates in this district; the bulk of these plates consumed here are brought from Staffordshire. This is the second works for the manufacture of these plates established here. A few years ago ironworks for the manufacture of these plates were started at Redhugh, Gateshead, and those works are now successfully carried on by Mr. Richard Cail and partners.

The Pig-iron Trade has been very steady during the past week, and there is a good delivery, which is likely to be maintained during the present month. Makers are very firm both for present and future account; they will not give way to "bear" offers for the winter. For present delivery makers are firm at 39s. to 39s. 3d. The manufactured iron trade continues remarkably steady. The ironworkers of the North have gone on quietly under the reduction of 7½ per cent., which came into force this week. The reduction of wages will enable manufacturers to compete with other districts. There is a reduction of 200 tons in Messrs. Connal's stores in the week, the stock standing now at 69,360 tons. Thirteen thousand tons of pig iron have been shipped during the past week. The fall in the price of iron during the past quarter will cause a fall in the Cleveland miners' wages of from 1 to 2 per cent., and also a fall in the wages of the men at blast-furnaces of 2½ per cent. The engineers' strike still continues at Sunderland; the men are well supported by the Amalgamated Society, who have ample funds, and they appear to be determined to fight the battle out; but the masters are also quite determined, and they have succeeded in getting a number of hands from other quarters, so that the work is now proceeding to a considerable extent; but the strike has done an immense amount of mischief in Sunderland.

The thirteenth session of the Durham College of Science was in-



augurated in the Wood Memorial Hall, Newcastle, on Monday, Dean Lake in the chair, and supported by a number of divines, commercial, and professional gentlemen. It is proposed to unite this College with the College of Medical Science under one roof, and in order to effect this it will be necessary to erect a new building. It is contemplated that the whole of the energies of the two bodies shall be combined under the general direction of the University of Durham. The Councils of these two bodies—the College of Physical Science and the College of Medical Science—have applied to the Corporation of the City of Newcastle to grant a site, and the application has been favourably received. It is hoped that a good site will be obtained, and that a building will be erected suitable for the accommodation of the students and professors of these institutions, and worthy of this great centre of industry and commerce. The report of the accountants shows the financial position of the College. The expenditure has exceeded the income during the past year by 460l. 11s. 6d. A considerable portion of this is due to the extension of the laboratory and to a change in the mode of paying the professors, which may be considered of an exceptional nature. Dr. R. S. Watson delivered the inaugural address. He observed that the Newcastle Literary and Philosophical Society was started in 1793. It was the first society of the kind in Newcastle, and a course of scientific lectures were arranged yearly, delivered once a week. In 1803 they raised 1000l. for the purchase of scientific apparatus. They had now an excellent Medical College and a College of Physical Science, but they are not sufficient for the needs of a great manufacturing and mining district. There was a great demand for systematic instruction in all branches of literature and science. At the present time amongst the Northumberland miners 1300 persons received systematic university teaching from graduates of Cambridge out of a population of 17,000 men, women, and children. This year six colliery villages contended for the honour being centres of such education. Up to the present time the work which this College had been doing had special reference to that class who could devote the whole of their time to study. They had not entered into the general educational life of the district; but they were about to take a new departure. The united Colleges of Medical and Physical Science had agreed to form an alliance; but he contended that the Faculty of Arts should be added, and that Newcastle should thus at length have a complete educational institution, in which instruction of the highest kind should be given, on terms which would make it accessible to all. He hoped to see an organisation which would connect all the educational atoms into one organic whole, beginning with the primary schools and ending with the university.

#### COPPER MINING AND SMELTING IN ARIZONA—REMARKABLE RESULTS.

The marvellous productiveness of the Copper Queen has already been referred to in the *Mining Journal*, and it appears that their system of smelting, for rapidity, continuity, and remarkable results, well keeps pace with the mining. The annual report of the Copper Queen Mining Company for the year ended April 30 affords, says the New York Mining Record, a satisfactory showing to the stockholders and creditable exhibit for the management, as may be seen from the following figures:—Sales of black and ingot copper, \$1,363,508.35; net value of year's product, \$1,314,973.25; total expenses, \$261,071.13; profit for the year, \$553,902.12. Out of this profit four dividends were paid, amounting to \$475,000, and the surplus of \$78,902.12, added to the surplus of the previous year, left a balance of \$267,023.51 in the treasury. There were smelted during the year 33,028½ tons, which produced 8,409,112 lbs. of black copper, 96½ per cent. fine. This result has been produced by the operation of two of Rankin, Brayton, and Co.'s Pacific copper smelters, each of 30 tons rated capacity, from which it will be seen that more than 45 tons of ore per day have been put through each smelter, with a daily bullion product from both of 23,038 lbs., counting every day in the year. No such showing, it is safe to say, has ever before been made with any other system of smelting in any part of the world.

It is not surprising that the working of the smelters gives full satisfaction to those connected with the management of the enterprise, as the output appears to increase each year. The superintendent of the Copper Queen furnaces says:—"Our record for the year 1881 shows a production of nearly five million pounds of bullion, the product of one smelter running continuously, and one only four months of the year, equal (say) to a 16 months' run of a 30-ton smelter. These furnaces are adapted to any class of copper ores, are simple in construction, easily handled, and with proper care are always in order. With an experience of more than 20 years in copper smelting, I have never seen a furnace that could compare with them for reliable, effective, and economical work—in fact, I know of no other furnace now made that will handle successfully the copper ores of our Western mining States and Territories." The production of this company for the year 1882 from the two smelters named was over 8,000,000 lbs., with an average fineness of 96½ per cent., and they are still running with the same degree of success.

And not the least remarkable feature connected with the system of smelting referred to is that ore of low produce can be treated with remunerative results, whilst with many systems either the smelting would be confined to turning out of bullion merely to obtain hard cash—the loss incurred being looked upon as interest paid for the loan of money—or the concern would have to be stopped altogether. In this connection, it may be remarked, that a correspondent of the Boston Herald, writing from Bisbee, Arizona, says:—"The Copper Queen Company, with the Rankin and Brayton Pacific Copper Smelters, can handle ores carrying not more than 5 per cent. with a profit, even with coke costing \$37 per ton, and heavy transportation charges on bullion. This gives some indication of the value and productiveness of the many copper mines in all parts of the country now operated with this system of reduction, the most of which will run from 12 to 30 per cent. It is evident from this that even a large decline in the price of copper would not seriously impair the margin of the copper producers of our Western mining States and Territories."

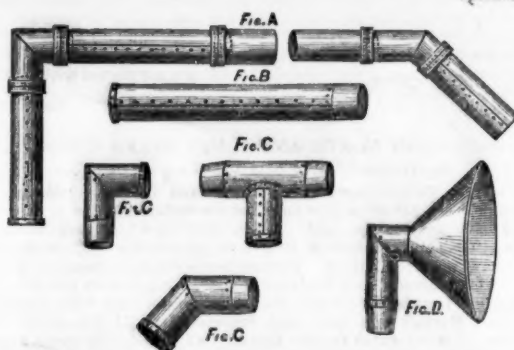
**UTILISING WASTE IRON PICKLE.**—The invention of Mr. LLEWELYN HOWELL, of Taibach, consists in utilising the waste liquor produced in pickling iron. He proposes to run the waste liquor from the pickling trough to an evaporating pan or pans, and there evaporate it, at the same time carefully skimming off the surface matters formed until the residue is of a syrupy consistency or is dry. And in the case of the waste liquor of hydrochloric acid he passes it into a suitable muffle furnace, with or without steam or vapour of water, and subjects it to a read heat, by which the acid is expelled from the compound (or base), leaving a residue of ferric oxide. If steam is not used in the furnace the resultant liquor is to be exposed to light. He adds a quantity of sodium chloride to the waste liquor in the evaporating pan, or to the compound in the muffle furnace. The gas from the muffle furnace is conducted to a condensing tower or other suitable condenser, and brought into contact with water, or the condensed solution of the evaporating pan, by which it is absorbed and forms hydrochloric acid, and is again ready for use in pickling troughs for treating iron or steel. He proposes to fix a condensing apparatus to the evaporating pan or pans in order to condense the vapours arising, which contain a quantity of hydrochloric acid gas, and to use the resultant solution with or without the addition of steam in the furnace to condense the gas from the furnace. The whole process, from the beginning of the evaporation until the whole of the hydrochloric acid gas is expelled and nothing remains but the ferric oxide, may be performed in the evaporating pan or furnace, or other suitable evaporating apparatus, but he prefers the process described as being more economical and effective.

**HOLLOWAY'S PILLS** can be confidently recommended as a domestic remedy for the ailments of all classes and conditions of people. Young and old of both sexes may take this medicine with the certainty of deriving benefit from its use when disorder or disease is making them miserable. Holloway's pills are unrivalled for their purifying, aperient, and strengthening properties. They remove indigestion, palpitation, and headache, and are specially serviceable in complaints peculiar to females. Each box is wrapped with printed instructions for the guidance of invalids who will readily understand from carefully studying them, the best way of recovering health. Holloway's pills will work a thorough change in the constitutions of the weak and nervous.

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Fig. C.—Different angle bends.  
Fig. D.—Is a hopper to receive air at top of shaft.

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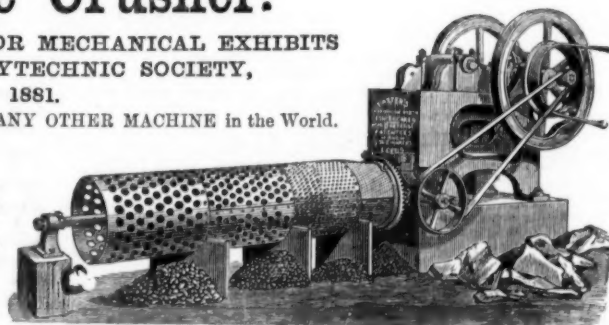
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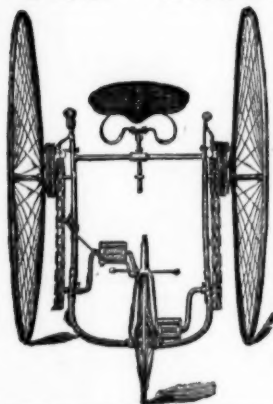
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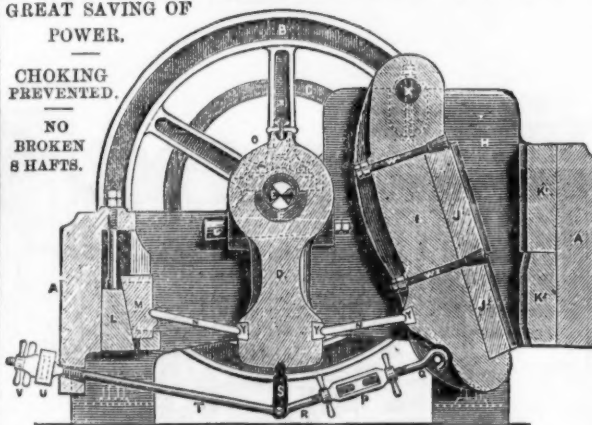
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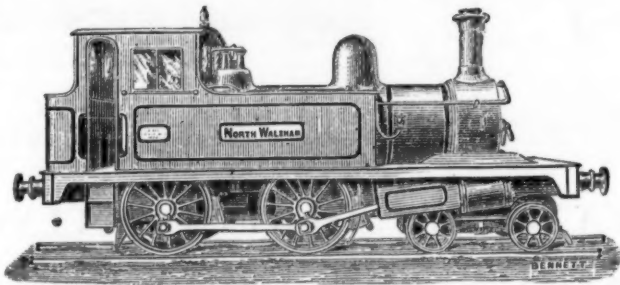
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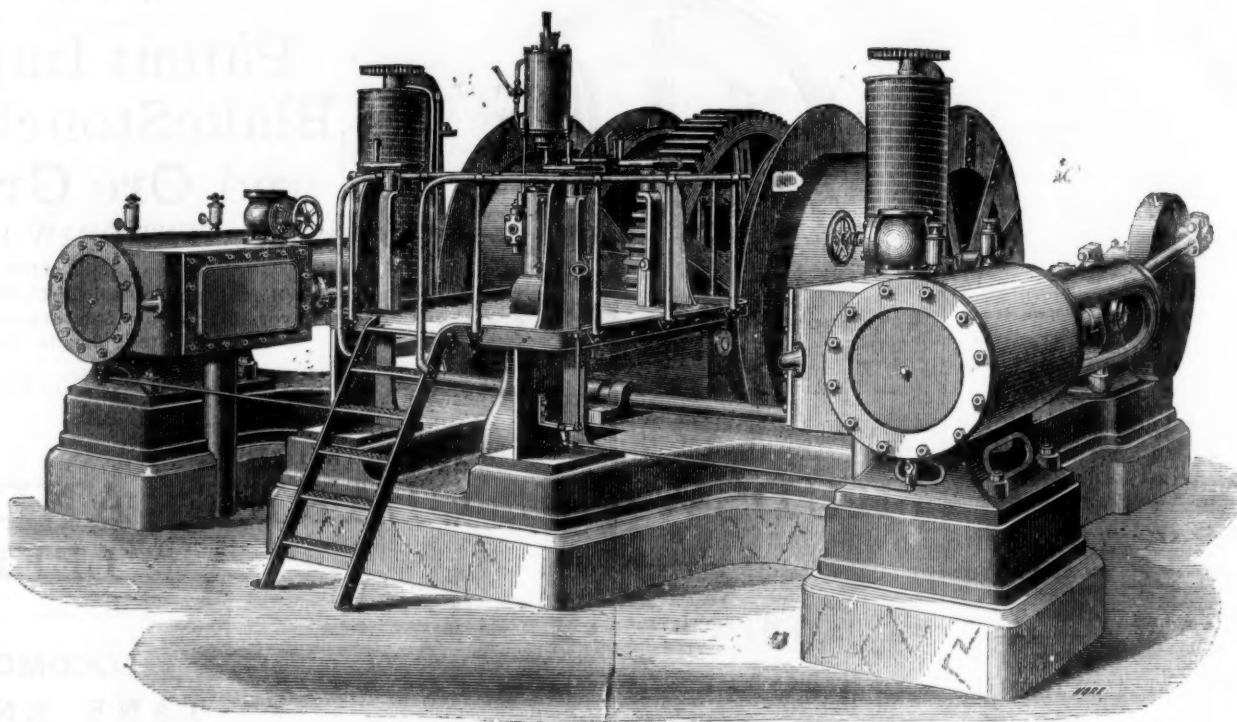
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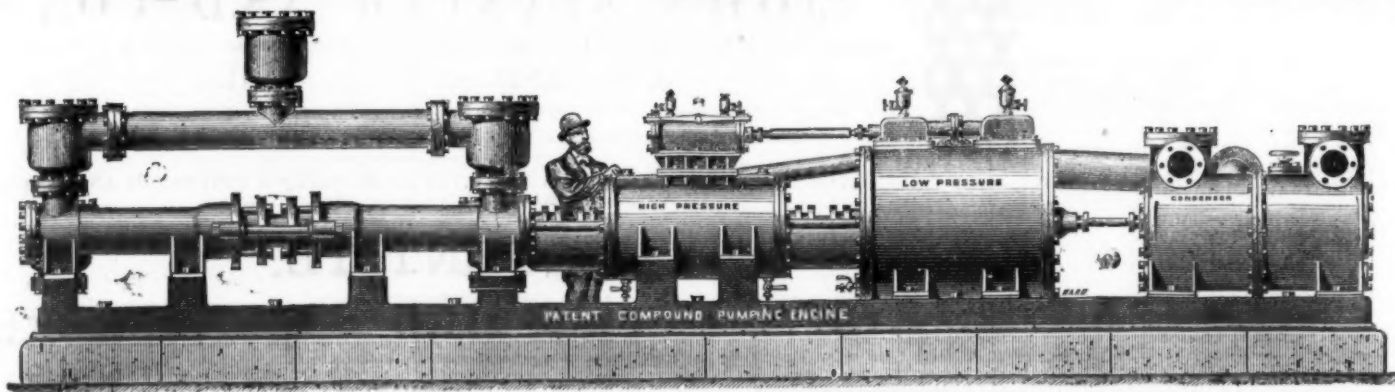
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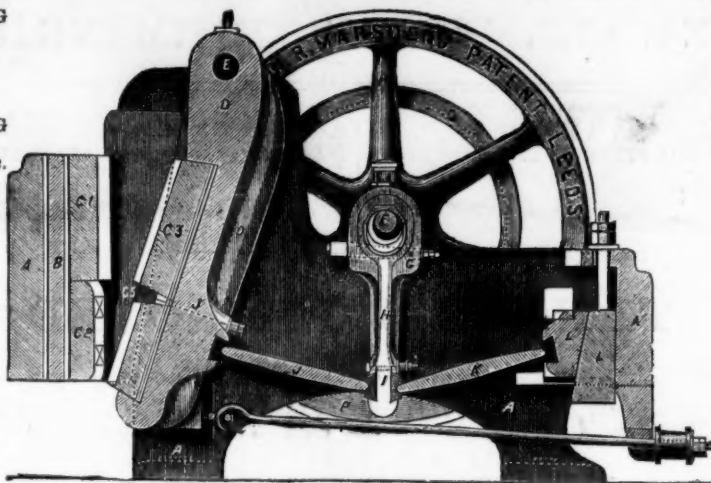
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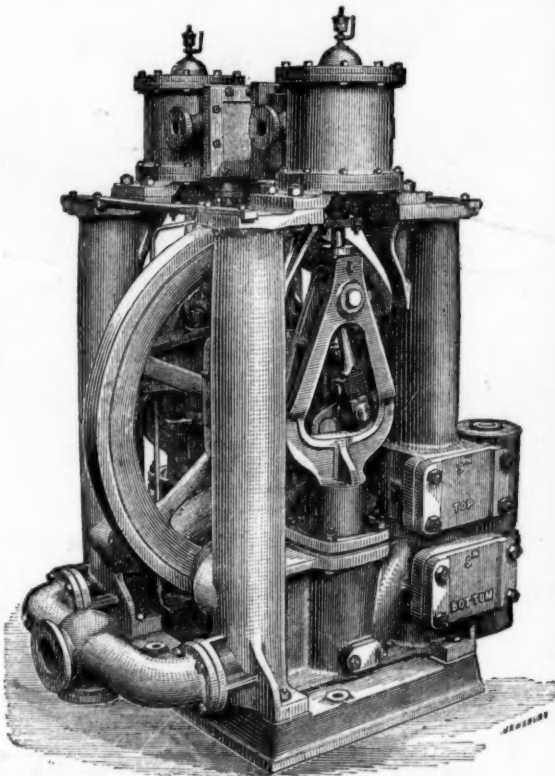
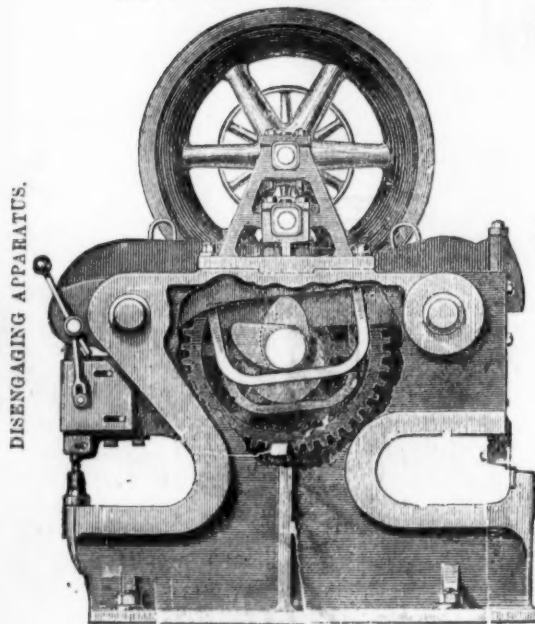
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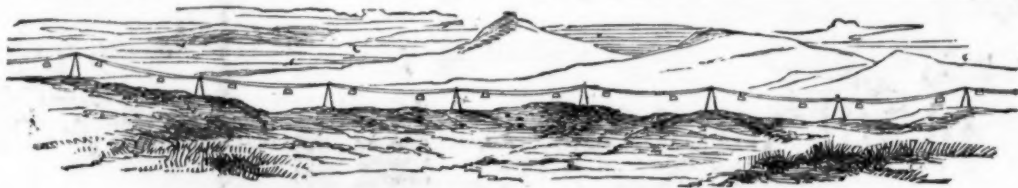
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